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PAPERS

LAID BEFORE THE

LEGISLATIVE COUNCIL

CEYLON.

1881.

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* The printing of this, nominally a "Sessional Paper" of 1881, has been unavoidably delayed; it will be bound with the Volume for 1882.

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PROCEEDINGS

OF THE

LEGISLATIVE COUNCIL.

Wednesday, 28th September, 1881.

PRESIDENT:

HIS EXCELLENCY SIR J. R. LONGDEN, K.C.M.G., President.

The Hon. JOHN DOUGLAS, C.M.G.,
The Hon. Major-General W. WILBY, C.B.,
The Hon. B. L. BURNSIDE,
The Hon. W. H. RAVENSCROFT,
The Hon. G. VANE, C.M.G.,
The Hon. F. R. SAUNDERS,
The Hon. F. B. TEMPLER,
The Hon. J. STODDART,
The Hon. W. D. WRIGHT,
The Hon. J. VAN LANGENBERG,
The Hon. P. RÁMA-NÁTHAN,
The Hon. F. M. MACKWOOD,
The Hon. W. W. MITCHELL.

1. MEMBERS SWORN.—The necessary oaths were taken by the Hon. J. Stoddart, and the Hon. W. W. Mitchell.

2. OPENING OF THE SESSION.—His Excellency the Governor opened the Session with the following address :—

HONOURABLE GENTLEMEN OF THE LEGISLATIVE COUNCIL,

THE usual period of our assembling has arrived, and I wish in the first place to express my satisfaction at meeting you again in Council. There are many questions of grave importance awaiting your consideration, and I venture to express my confident hope that your decisions upon them will tend to secure the true and lasting benefit of the Colony.

FINANCE.

Revenue of 1880.

2. According to custom, the finances will claim your first attention. It was my painful duty last year to point out how largely the revenue of 1879 had receded from the high level the revenue reached in 1877. In 1880 it further declined. The revenue had been estimated at Rs. 14,754,000. It only reached Rs. 13,849,127, being nearly a million rupees less than the estimate.

3. The following comparison of the amount of revenue received in each of the last four years will show the progressive fall which has resulted from the continued depression of trade and the diminution of the coffee crop :—

In 1877 the revenue amounted to	Rs. 17,026,183
„ 1878 „ „ „ „	16,462,086
„ 1879 „ „ „ „	14,448,668
„ 1880 „ „ „ „	13,849,127

Thus, as compared with 1877, there has been a fall of no less than Rs. 3,177,056.

4. The six branches of revenue in which the decline is greatest are the Sales of Crown Lands, Railway Receipts, Licenses to sell Arrack, Sales of Government Property, Customs, and Grain Taxes. The amount of the decline in each branch, comparing the revenue of 1880 with that of 1877, is as follows :—

In Land Sales the decline is	...	Rs. 1,042,769
„ Railway Receipts	...	605,740
„ Licenses, chiefly for sale of Arrack	...	535,548
„ Sale of Government Property	...	535,233
„ Customs	...	372,406
„ Land Revenue, chiefly Grain Taxes	...	197,696

5. The decrease in other branches of the revenue was comparatively little, and in some items there has been an increase.

6. In considering the general financial position of the Colony it must be borne in mind that, as I pointed out last year, the revenue of the year 1877 was exceptional, and exceeded the revenue of either preceding or subsequent years.

7. In no branch of the revenue was the amount collected so exceptional as in the Receipts from the sale of Crown Lands, which rose from a yearly average for the 10 years 1866-76 of Rs. 677,375 to Rs. 1,550,983. A large decrease must, under any circumstances, have taken place in

this branch of the revenue, and the decline that has taken place is hardly larger than might have been anticipated in the great commercial depression under which the Colony has suffered.

8. The falling off in the Railway Receipts is a much more serious matter, indicating as it does a reduced traffic on the main line. Of the cause of this falling off there is, unhappily, no doubt at all. It is to be found in a comparison of the quantity of coffee carried in the last and preceding years. In 1877 there were 58,987 tons carried; in 1878, 42,677 tons; in 1879, 48,402 tons; but in 1880 only 33,171 tons. The actual receipts from the railways in 1880, including the Kalutara, Mátalé, and Colombo Wharf extensions, amounted to Rs. 3,012,391. The total expenses of the railway, including maintenance, new works, improvements, and all other charges except interest on loans, amounted to Rs. 1,512,253—50, leaving a balance to credit of Rs. 1,500,137—36, from which is to be deducted the interest and sinking fund of the railway loans, amounting for the year to Rs. 870,000, leaving a nett profit to the Colonial Treasury of Rs. 630,137.

9. The Mátalé extension was opened for traffic on the 4th of October, 1880, and I regret to see from the report of the Traffic Manager, that while the working expenses of the line for the three months of the year that the line was open amounted to Rs. 28,614—62, the receipts from the traffic only amounted to Rs. 35,343—47, leaving a balance of Rs. 6,730, which was quite insufficient to pay the interest on the loan contracted for building the line. It is, I hope, fair to expect that the traffic will improve, and that the opening of the line will both lead to the cultivation of new products and will encourage native industries.

10. The seaside line from Colombo to Kalutara, including the branch to the Wharf, yielded last year a total revenue of Rs. 358,954—40, and the working expenses amounted to Rs. 265,035—58, so that there was a profit on this line of Rs. 93,918. The traffic on this line is confined almost exclusively to passengers.

11. The amount of the revenue obtained from Licenses has gradually declined since 1877, and the sum received under this head in 1880 was less by Rs. 64,812 than the sum received in the preceding year. This revenue is chiefly raised from licenses to sell arrack, and the amount raised necessarily varies with the prosperity of the classes who are the chief consumers of arrack. The mode in which the arrack revenue is raised, as the Council is aware, is by farming out to the highest bidder the exclusive right to sell arrack in certain districts. This method of raising the arrack revenue has been in force for many years, and it is certainly the most economical method in which the revenue could possibly be raised. But it is subject to certain drawbacks. Occasionally the renters offer a larger sum for their licenses than the trade of the district warrants, and failure ensues. On the other hand, it not infrequently happens that the renters, who are a comparatively small class of men, do not bid what is considered a fair price for the licenses. From these causes the arrack revenue is subjected perhaps to greater vicissitudes, and is perhaps less productive, than it would be if the English mode of raising the duty by means of an excise on all arrack manufactured for consumption in the Colony were adopted. There would however be great difficulty and certain loss of revenue at first in making such a change, for there is no experienced excise staff, and indeed no staff at all; and, while the cost of creating such a staff as would be necessary to collect an excise duty would certainly cause an enormous immediate addition to our expenditure, it seems probable that the facilities which exist for undetected distillation would at first largely reduce the receipts, though perhaps a larger and more certain revenue would hereafter be obtained. In the present state however of the general revenue I have thought it expedient to defer proposing any alteration in the law, waiting for a more favourable opportunity for dealing with the question.

12. The loss of revenue under the head of Sale of Government Property is more apparent than real, being the result chiefly of an alteration in the mode of keeping the accounts of the Colonial Store.

13. The Customs, which had declined in 1878 and 1879, yielded in 1880 a trifle more than it did in the preceding year, which is satisfactory as showing that the decline which had taken place since 1877 had been arrested.

14. The Land Revenue, consisting chiefly of the grain taxes, yielded nearly the same amount in 1880 as it did in the previous year, the difference being only Rs. 11,418. The Council will no doubt bear in mind that a decrease in this branch of revenue was always anticipated both by the Government and the Council as the immediate result of the commutation of the grain taxes now being carried out. The Government and this Council will not however grudge some small loss of revenue through the operation of a measure which will secure so many advantages to the native cultivators as the grain tax is designed to give them.

Expenditure of 1880.

15. The expenditure of 1880 was originally estimated at Rs. 14,484,210. Supplementary estimates were subsequently voted amounting to Rs. 505,699, making the total expenditure of the year as authorized by law Rs. 14,989,909. In consequence however of the fall in the revenue, every endeavour was made to curtail the expenditure where it was possible to do so, and it was reduced to Rs. 14,264,490. This expenditure, though less than what was authorized by Rs. 725,419, was greater than the revenue by Rs. 415,362, and the excess has had to be charged against the balances.

Revenues of 1881.

16. The revenues of 1881 were estimated at a total of Rs. 13,508,000. Up to the end of August the amount received was Rs. 8,270,121, to which is to be added the profit of the Pearl Fishery amounting to Rs. 600,000, making a total of Rs. 8,870,121, being less than the proportionate part of the estimate by Rs. 155,211. The expenditure of the year is being strictly controlled, and will, I trust, be fully covered by the revenue.

Estimates for 1882.

17. Basing our calculations on the experience of the two past years, the revenue for the ensuing year is estimated at the sum of Rs. 13,025,000, and the expenditure has been adjusted so as to be kept within that limit. It is therefore again necessary to defer the execution of large Irrigation and other new works, which I should have been glad to propose for your consideration if the state of the revenue permitted a sufficient appropriation to be made. The great public works for which loans have been authorized by this Council will not of course be affected.

18. The Colony will in 1882 be relieved of part of the charges for the interest and sinking fund for the Kandy railway. This charge, which has for some years averaged Rs. 696,000, will be reduced to Rs. 162,000. On the other hand, largely increased sums have to be provided for the interest of the loans borrowed for the construction of the Mátalé and Nanu-oya lines, amounting together to Rs. 661,650, making a total charge of Rs. 823,650.

19. In connection with this I would call the especial attention of the Council to the very favourable terms upon which the last loan of £575,000 for the Nánu-oya line was contracted. The 4 per cent. £100 debentures were offered by the Crown Agents in London at £102, and were taken up at an average of £103 13*s.* 8*d.* More than four times the amount of the loan was offered, showing the high estimation in which the financial credit of Ceylon is held.

COLOMBO HARBOUR WORKS.

20. The resolution passed by the Council in the last session relative to the completion of the Colombo Harbour Works was transmitted to the Secretary of State at the end of October, 1880, and was communicated by the Earl of Kimberley to the Consulting Engineer for his report in December, 1880. Sir John Coode's reply, together with some further correspondence, will be laid before you. Sir John Coode in this interesting report has so fully discussed the various suggestions that have been offered for reducing the cost of the works by limiting them to a single Breakwater and omitting the proposed North Arm, that I need not detain you by recapitulating his arguments, but will point your attention at once to the emphatic opinion he has arrived at, "that *it is absolutely "impossible to provide by a single arm, however placed, such protection as ought to be afforded;*" and that if the works were limited to the construction of a single arm, "there cannot be a doubt that in "the discharging, loading, and transhipment of cargoes much inconvenience would be experienced, "nor could the area of the harbour be utilized by anything like the same number of vessels at one "time, as would be the case if perfect shelter were afforded from all quarters." I should incur a grave responsibility if, notwithstanding the resolution passed by the Council in the last session, limiting the expenditure to £800,000, I did not press upon your earnest attention this clear and decided opinion, given by the ablest and most experienced Engineer of Harbour Works in England, given, too, after a full consideration of all the proposals that have been made and with a personal local knowledge of the harbour that enables him to speak authoritatively.

21. The design for the completion of the harbour which Sir John Coode again advocates is that known as Design B. with some modifications. It will be remembered that when this design was under the consideration of the Council last year, the cost of it was estimated at £1,008,458, being £208,458 in excess of the sum to which the Council deemed it expedient to limit the expenditure. You will see by the papers laid on the table that the Consulting Engineer has been able to modify this estimate, and to reduce it by nearly a hundred thousand pounds. According to the new estimate, the cost of executing the works on the modified design will be £910,639, being £110,639 in excess of the limit previously fixed. It is for the Council to determine whether, on consideration of the report, you are prepared to assent to this increase of expenditure, which according to Sir John Coode's report is absolutely necessary for "providing complete shelter during *all* winds and in *all* "states of the sea, so that the loading and discharging of steamers and the general traffic of the port "may be carried on with convenience and without interruption in every part of the new harbour."

22. The Council will see by the papers laid on the table that great attention has been given to the important question that was raised in the discussions that took place last year as to the difficulty which large ships might experience in bringing up, after entering the harbour at the rapid pace which an entrance so narrow as 600 feet made imperative. In consideration of this apprehended difficulty, the width of the entrance has been increased in the new design to 800 feet, and the highest Naval authorities at the Admiralty, with whom I was placed in communication while in England, expressed an opinion that there would be no such practical difficulty in bringing steamers to within the available space inside the harbour, the water being quite smooth, as would make it necessary to abandon the North Arm, which on general grounds they deemed advisable.

RAILWAYS.

23. In fulfilment of the promise I made during the last session of the Council I again brought prominently under the notice of the Secretary of State the desire of the Council and of the people of the districts of Haputalé and Badulla for an early commencement of the railway from Nánu-oya to Haputalé, and I laid before His Lordship at the same time the Memorial of the Planters, Merchants, and native traders of Haputalé and Badulla. A copy of my despatch and of the reply of the Earl of Kimberley will be laid on the table. In his answer the Secretary of State writes that he "has "come to the conclusion that at the present stage of the works on the Nánu-oya line, and looking "to the existing unsatisfactory condition of the Colonial revenues, he would not be justified in giving "instructions that would involve an engagement to commence the Haputalé extension within any "particular time." At the same time His Lordship has intimated that the memorialists "may rest "assured that the matter will not be lost sight of," and I trust that, though the commencement of

the extension is now postponed, the work, which is necessary in the interest of the planters and of the natives alike, will be carried out at an early date.

24. The works on the Nánu-oya line are progressing fairly, but some time must elapse before any part of this road is open for traffic.

COLOMBO WATERWORKS.

25. The third great work which the Council have sanctioned is the scheme for supplying Colombo with fresh water. A correspondence which has taken place in England on this matter has been communicated to the Municipal Council, and will be laid upon the table. An immense quantity of the iron piping required for the works has been received from England, and a road has been made to the site of the projected reservoir, and it is hoped that the works for the reservoir will be commenced without any unnecessary delay.

THE CENSUS.

26. The Census which you authorized by Ordinance in the last session was taken in the month of February, and the result of it is fairly satisfactory, showing that notwithstanding the severe outbreaks of cholera and other diseases which have occurred in different Provinces during the last ten years, the whole population of the Island has increased during the decade by nearly 15 per cent. Naturally the increase has been most marked in the Central Province, especially in the Nuwara Eliya District, where so much additional land has been cleared for cultivation. In this District the population has increased by more than 69 per cent., while over the whole Province there has been an increase of 29 per cent. The Western and Eastern Provinces show an increase of 15 and 13 per cent. respectively. In the other four Provinces the increase is much smaller, and in the North-Central Province it is only 3·59 per cent. The Census tables will be laid on the table together with the report, when completed, of the Acting Registrar-General, by whom all the arrangements for taking the Census were most ably and economically conducted.

LEGISLATION.

27. The principal legislative work which I had contemplated bringing before the Council in this session was the much-needed reform both in our Criminal Code and in the laws regulating the practice and procedure of the Courts of Justice in both Civil and Criminal matters, which has already been under the consideration of the Council. Various circumstances have, however, combined to make it desirable to postpone the introduction of the Criminal Code till another session, when I hope nothing will prevent the accomplishment of the full measure of law reform, the necessity of which was pointed out by the late Chief Justice and is generally admitted.

28. Among the legislative measures which will now be submitted to you will be an Ordinance to amend so much of the Civil List Ordinance of 1870 as relates to Ecclesiastical Establishments, and to make provision for the prospective withdrawal of the annual grants which have heretofore been and are still made from the Colonial Treasury to certain Christian Churches. It will be seen from the correspondence that has taken place and been made public, copies of which will be laid before you, that Sir Michael Hicks-Beach early in 1880 drew my attention to the expediency of revising the Civil List Ordinance of 1870. In reply I thought it my duty to call the attention of the Secretary of State to the discussions which took place in this Chamber on the subject of Religious Endowments in 1876, and to the protest of certain members of this Council against the principles of such endowments, which protest had up to that time remained unanswered. The Secretary of State in reply informed me that Her Majesty's Government were of opinion that it was impossible to justify the inequality of the endowments which existed as between Christian denominations, and that the only fair and practicable course would be, concurrent endowment being out of the question, to withdraw gradually, as vacancies occur, the whole provision now made for ecclesiastical purposes from the Public Treasury, securing to present incumbents their salaries as long as they continue to exercise their functions, and the pension rights which they now enjoy. Moreover it is proposed that a period of grace be allowed to the aided Churches, and that the salaries of any ecclesiastical offices that may happen to fall vacant before the 1st of January, 1886, shall be paid to the Trustees of the Church in which the vacancy shall occur.

29. The withdrawal of State aid will, when accomplished, leave the Christian Churches now receiving that aid entirely dependent on their own resources, but in the meanwhile it is necessary that there should be Trustees representing the Churches, to whom may be legally paid the moneys that will be annually payable to the respective Churches during the years of grace, if you approve the proposals laid before you. In some of the Churches such Trustees already exist, but in the Church of England an assembly representing, informally perhaps, but as I understand substantially, the wishes of the members of the Church, have passed a resolution praying for the incorporation of a Board of Control and of Trustees for financial purposes alone. A Bill limited to this object only will be laid before the Council.

30. The Secretary of State having advised the confirmation of the Ordinance passed last year for providing for the medical wants of immigrant labourers in certain planting districts, subject to an amendment in the law as to the mode of raising the necessary funds, a Bill will be laid before you for carrying into effect the instructions of Her Majesty's Government by repealing the clauses enacting an export duty on produce, and substituting for it an assessment of each plantation based on the number of coolies actually employed upon it This is theoretically the fairest mode of assessing the cost, and it would have been adopted by my Government last year but for the practical difficulties which were anticipated in carrying out such an assessment. It is, however, in the power

of the planters to remove most of these difficulties, and I trust that with their aid the assessment will be equitably carried out.

31. A Bill will be laid before you, founded upon the representation of the Planters' Association, for continuing in force for two years the Ordinance re-passed in 1879 to check coffee stealing. This Ordinance would unless renewed expire at the end of the session, and I have reason to believe that though the prosecutions under it are not numerous, it is beneficial as a preventive measure.

32. Bills will be laid before you for amending certain existing Ordinances, in regard to which I will not detain you at present.

Coffee and other Products.

33. I have within the last few days received through the Director of the Royal Botanical Gardens a further report upon the coffee leaf disease by Mr. Ward. This most able and deeply interesting paper will forthwith be laid on the table. In the opinion of Dr. Trimen it exhausts the subject, and completes the work which Mr. Ward undertook, so far as it can be carried out in Ceylon. Although Mr. Ward has not been able to suggest any mode of treating the disease which shall absolutely eradicate it, he has at least given to the world in the life history of the *Hemileia* the true data upon which a mode of dealing with the disease may hereafter be founded, and in the meanwhile such remedial measures may be adopted as may enable the coffee to withstand the strain of the disease. Although vast injury has doubtless been done by the disease, the export of coffee from Ceylon will long continue to exceed in value by far all other exports put together. It is, however, very satisfactory to note that other products, both old and new, are fast increasing in quantity and value. The export in 1880 of the produce of the cocoanut in its various forms was valued at six millions of rupees. The quantity of cinchona bark exported has risen from under 15,000 pounds weight in 1876 to 1,161,989 pounds weight in 1880. The export of tea also has doubled. Tobacco is another staple which experience has shown can be profitably grown in Ceylon. The value of the exports of tobacco last year exceeded a million rupees, and, considering the unceasing demand for this article, the cultivation of it on a large scale on suitable soil could hardly fail to be successful. Other products such as India rubber and cocoa are being grown in increasing quantities, and I feel confident that the exports of future years will exhibit a variety of products which may in time equal the value of our coffee crops.

34. In connection with this question there will be laid on the table the Report of the Commission appointed by the Lieutenant-Governor at the instance of the Secretary of State on the best mode of introducing new cultures in Ceylon, and on the amount of assistance in doing so which the Government may be expected to, and will most gladly give.

Public Instruction.

35. The improvement of the education of the people occupied much of our attention during the last session, and by the liberality of the Council the aggregate votes for Public Instruction were increased until they bore a much larger proportion to the whole public expenditure than is usual in other countries, and have reached the utmost limit that can be allowed here. It is satisfactory to learn from the latest reports of the Director of Public Instruction that the large expenditure under his control has produced fair results, that the examinations and inspections of both primary and superior schools have been generally creditable, and that by the exercise of a judicious economy the average cost to Government per head for 81,114 children in the 1,202 schools receiving aid from or supported by Government was 5 rupees and 67 cents

36. The report of the Director upon the Colombo Academy for the past year will be read with much interest, for the records of this our chief educational institution show that it is steadily advancing in importance, and the number of pupils, which was only 109 in 1875, has risen to 191, while the number of subjects taught has been so increased as to give its students the opportunity of acquiring a knowledge of chemistry and other sciences in addition to the usual training of a classical and mathematical school. The appropriate title which by Her Majesty's gracious permission the Academy has now assumed will mark, I trust, the commencement of a long and flourishing career for the Royal College.

37. There is another institution which has received a special mark of recognition in the present year. The Ceylon Medical School has as yet had a short career, but a career long enough to show its great usefulness, to justify the support it has received from this Council, and to earn its well-merited recognition under the title of "The Ceylon Medical College" at the hands of the General Council of Medical Education in England

Defence of the Colony.

38. It is with great pleasure that I bring under the notice of the Council the formation since our last session of a Regiment of Volunteers numbering over a thousand strong, in which Englishmen, Burghers, Sinhalese, Tamils, and Malays have all combined, without distinction of race or creed, for the one thing which all hold equally dear,—the defence of Ceylon. The movement will, I feel assured, commend itself to this Council as one of high importance, justifying the small expenditure which it has made necessary The Regiment will, I do not doubt, become with practice as efficient as any of the Regiments of Volunteers who have lately been reviewed in Great Britain, and will most assuredly be a very valuable auxiliary to the Regular Forces in any invasion. But it is not on Infantry alone in these days that our ports can rely for defence. The heavy Artillery now carried by ships of war necessitates equally heavy Artillery to repel it, and I am glad to inform the Council that a Commission has been appointed at the desire of Her Majesty's Government to consider the question of the defences of our chief ports.

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39. I cannot conclude my Address without stopping for a moment to lament the loss which this Council has recently suffered through the lamented death of the Honourable Mr. J. P. Obeyesekere. He sat for three sessions in the Council, and showed such a keen interest in public questions and such a wide knowledge of the habits and feelings of the native populations, that the Council will, I know, agree with me in deploring the unhappy accident which led to his early death.

GENTLEMEN,

I trust that your decisions on the various questions that will be submitted to you will conduce to the one end we all have in view,—the prosperity and welfare of the people of Ceylon.

3. His Excellency the Governor having retired, the chair was taken by the Hon. the Lieutenant-Governor.

4. ADDRESS IN REPLY TO HIS EXCELLENCY'S SPEECH.—The Auditor-General moved that the following gentlemen be appointed a Sub-Committee to prepare the Address in reply to His Excellency's Speech:—The Government Agent, Western Province, the Surveyor-General, the Principal Collector of Customs, the Hon. P. Ráma-Náthan, the Hon. F. M. Mackwood, and the Hon. W. W. Mitchell.

Seconded by the Major-General.—Carried.

On the motion of the Auditor-General, the Council at its rising adjourned to Wednesday, the 5th October, at 3 o'clock P.M.

Wednesday, 5th October, 1881.

October 5, 1881.

1. The Council met pursuant to adjournment. The Lieutenant-Governor took the chair.

2. ADDRESS IN REPLY TO THE SPEECH OF HIS EXCELLENCY THE GOVERNOR.—The Government Agent, Western Province, moved the adoption of the Draft Address in reply to the Speech of His Excellency the Governor, which was read by the Clerk of the Council.

Seconded by the Auditor-General.—Carried.

The Council then adjourned.

3. His Excellency the Governor having arrived, took the chair.

4. The Lieutenant-Governor read the Address of the Council in reply to the Governor's Speech:—

MAY IT PLEASE YOUR EXCELLENCY,

1. THE Legislative Council congratulate Your Excellency on your return to the Island, and thank you for your Address.

2. They regret that the returns of revenue show such a continuous decline in the last four years, but they concur with Your Excellency in regarding the collections during the earlier part of that period as altogether exceptional, and in thinking that the decrease is not greater than might have been expected in the prevailing general depression. It should be borne in mind that, notwithstanding all unfavourable circumstances, the revenue of 1880 exceeded the average of the ten years ending 1876 by nearly two millions of rupees.

3. The shortness of the coffee crop in 1880 could not fail to seriously affect railway receipts, and it is matter for congratulation that, after payment of all expenses, including interest and sinking fund, there should still be a nett profit to the Colonial Treasury of Rs. 630,137.

With reference to the Mátalé extension, it is to be remarked that, previous to the opening of that branch, arrangements had already been made for the despatch of much of the crop of that District, and it is hoped that the present season will show a more favourable result in working. The Kalutara line, the Council are glad to learn, has given a profit of Rs. 93,918, almost exclusively the result of passenger traffic, and they view this in itself as affording strong inducement for the immediate extension of railway communication to other populous districts.

4. The Council will give the Estimates, when laid before them, their careful attention. Whilst they regret that the expenditure exceeded the revenue of 1880 by Rs. 415,362, they are glad to be informed that the expenditure of 1881, under the exercise of strict control, is likely to be fully covered by the revenue. They agree with Your Excellency in thinking it desirable to defer, for the present, the execution of large Irrigation works, but hope that other public works of a remunerative character will not be postponed, if funds are obtainable for their construction.

5. With regard to the Colombo Harbour Works, the Council observe that the last modified Design B. involves an expenditure of £910,639, being £110,639 in excess of the limit the Council were prepared to sanction, and, in view of the opinion expressed by the Consulting Engineer, that the accommodation thus provided would be sufficient and available for the largest ships of Her Majesty's Navy, they would be glad to learn that the Imperial Government is prepared to contribute the amount so required in excess of £800,000.

6. It is gratifying to learn that Your Excellency brought prominently before the Earl of Kimberley the desirability of an early commencement of the railway from Nánu-oya to Haputalé. Much disappointment is felt that the Secretary of State does not feel justified in permitting the

construction of the line within any particular time; the Council hope, nevertheless, that a work of such paramount importance to the successful working of the line now being constructed beyond Náwalapitiya may not be long delayed.

7. The correspondence relating to the Colombo Waterworks, when laid upon the table, will receive attention. At present the Council are unable to account for the extraordinary delay which has taken place in calling for tenders and commencing the work.

8. The Council note with pleasure the satisfactory result of the Census taken in February last.

9. It is with regret the Council learn that the much-needed reform in the administration of civil and criminal justice, which has already been postponed for several Sessions, is again to be delayed, and they join with Your Excellency in hoping that nothing will be permitted to defer the accomplishment of so important a work beyond another Session.

10. The Bills to amend the Civil List Ordinance as regards Ecclesiastical Establishments, and the Ordinance relating to the Medical Wants of Immigrant Labourers, will receive from the Council the full consideration which measures of such great importance demand.

11. The Council are greatly interested in Your Excellency's observations with reference to coffee leaf disease. They note that, in the opinion of Dr. Trimen, Mr. Ward has succeeded in completely investigating the nature and character of the disease, although he is unable to suggest any mode of treatment which will absolutely eradicate it, and, whilst hoping that a remedy may yet be found, the Council anxiously await the production of the promised papers. The importance to the Colony of fostering the cultivation of the new products, to which Your Excellency refers, cannot be over-estimated, and the Council will be prepared to assist in granting all reasonable facilities for extending it.

12. It is gratifying to know that the liberal votes for Public Instruction granted last year have produced such satisfactory results, and that the Royal College and the Ceylon Medical College continue to make marked progress.

13. The formation of a Regiment of Volunteers is a movement of no ordinary importance, justifying any reasonable expenditure that may be necessary. The Council desire to express a hope that the movement may lead to a diminution of the burden of Military Expenditure, and that this may not be added to at the instance of the Coast Defence Commission.

14. The Council unite with Your Excellency in the expression of regret at the untimely death of the Hon. Mr. J. P. Obeyesekere.

15. Your Excellency may rely upon the co-operation of the Council in all measures having for their ultimate object the advancement and prosperity of the Colony.

5. The Governor replied as follows:—

HONOURABLE GENTLEMEN OF THE LEGISLATIVE COUNCIL,

I THANK you for your reply to my Address, and for the assurance of your co-operation in all measures designed for the advancement of the interest of the Colony. I especially thank you for your congratulations on my return to Ceylon after my late absence.

6. PAPERS.—The Lieutenant-Governor laid on the table the following papers:—

Sessional Paper 1, 1881.—Reports upon the Akkati Murippu Tank and Modaragamoya Works, by Mr. Henry Parker, Irrigation Officer.

Do. 2 „ —Correspondence on the subject of the Police supervision of the routes between Colombo and Ratnapura.

Do. 3 „ —Report on the Commutation Settlement of the Meda and Adikári Pattus of the Siyané-kóralé under the *Grain Tax Ordinance*, 1878.

Do. 4 „ —Despatch from the Secretary of State on the subject of the present condition of the Coffee planting industry in Ceylon, and the demand for developing new industries.

Do. 5 „ —Return to an Order of the Legislative Council of Ceylon, dated 10th November, 1880: "That a return be furnished showing the number of cases instituted in each of the Police Courts of the Island under the *Cattle Trespass Ordinance*, No. 9 of 1876, from the passing of that measure to 30th September last, the number of convictions, the appeals taken, and the affirmals by the Supreme Court upon such appeals.

Do. 6 „ —Despatch from the Secretary of State enclosing a Memorandum by Sir J. B. Phear, Kt., on the objects and reasons of the Ordinance on Criminal Procedure.

Do. 7 „ —Return to an Order of the Legislative Council, dated 8th December, 1880: "That a return be furnished showing the number of Guns appearing as registered in each Kachchéri, and a statement of the number of Shooting Licenses issued under Ordinance No. 6 of 1872 since it came into operation—(*a*) to Europeans, (*b*) to Natives.

Sessional Paper 8, 1881—Report on the Paraggi Disease of Ceylon, prepared by Dr. W. R. Kynsey, Principal Civil Medical Officer.

Do. 9 „ – Colombo Harbour Works.—Nautical Opinions expressed by the Commanders of Steamers frequenting the Port of Colombo in reply to a Circular from the Master Attendant of Colombo.

Do. 10 „ —Village Tribunals.—Statement showing the Districts, Presidents, their Salaries and Staff, and the number and nature of the Cases disposed of during the year.

Do. 11 „ —Report on the Pearl Fishery of 1881.

Do. 12 „ —Report on the Commutation Settlement of the Kuruwitikóralé, Sabaragamuwa District, under the *Grain Tax Ordinance*, 1878.

Do. 13 „ —Report of the New Products Commission appointed to report on the question of the introduction and cultivation of New Cultures in Ceylon.

Do. 14 „ —Correspondence on the Ecclesiastical Subsidies in Ceylon.

Do. 15 „ —Further Correspondence relative to the Colombo Harbour Works.

Do. 16 „ —Summary of steps taken for the formation of a Volunteer Regiment for Ceylon.

Administration Reports, 1880, Part I., Revenue :—

Customs.

Report of the Government Agent, Western Province.

Part II.—Scientific :—

Report of the Surveyor-General.

Report of the Director of Public Works.

Part IV.—Miscellaneous :—

Report of the Postmaster-General and Director of Telegraphs.

Report of the Director of Public Instruction.

Report of the Director of the Colombo Museum.

7. Administration Reports.—The Hon. P. Ráma-Náthan gave notice that at the next meeting of Council he would ask—

"(1) Why reports on the administration of the several Departments of the Colony are not furnished to the Council earlier than is now the practice ; and (2) why the Council has not received to this day Reports from the following Departments, viz. :—

That of the Government Agent, Northern Province.
Do. do. North-Central Province.
Do. do. Central Province.
Do. do. North-Western Province.
Do. do. Eastern Province.
Do. do. Southern Province.
Do. Prisons.
Do. Police.
Do. Railway.
Do. Queen's Advocate.
Do. Registrar-General.
Do. District Judges.

And move that such Administration Reports be supplied to the Members of this Council not later than August.

8. Colombo Waterworks.—The Government Agent for the Western Province gave notice that at the next meeting of Council he would

"Call attention to the great delay that has occurred in commencing the Colombo Waterworks, and to move for any papers which may have been received on the subject since the date of the Despatches forwarded to the Municipal Council in July last."

9. Return of Cash Balances.—The Hon. W. W. Mitchell, pursuant to notice, moved for a return showing—

"1.—The cash balances of the Colony as on the latest date at which they have been ascertained ;

2.—The total surplus revenue on 31st December, 1880, including the balances of all lapsed votes to that date :

3.—The balance of Railway Construction Fund, if any, on the 31st December, 1880;

4.—The amount available for appropriation from unclaimed balances of the Loan Board on 31st December, 1880;

And moved that a similar return be made annually at the commencement of each Session of Council."

Seconded by the Hon. J. VanLangenberg.

The Lieutenant-Governor replied and promised to furnish the return applied for.

10. Bill for securing the status of French Mail Steamers within the Ports of the Colony.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to make temporary provision for securing the status of French Mail Steamers within the ports of this Colony," was read a first time, and the second reading fixed for the next meeting of Council.

11. Colombo Harbour Works Bill.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill intituled "An Ordinance to amend the Ordinance No. 1 of 1876, intituled 'An Ordinance for the raising by Debentures of a further sum of £400,000 sterling for the improvement of the Colombo Harbour,'" was read a first time, and the second reading fixed for next meeting of Council.

12. Arrack License Bill.—On the motion of the Auditor-General, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to amend the Ordinance No. 10 of 1844, intituled 'An Ordinance to amend the Law relative to the distillation and sale of Arrack, Rum, and Toddy within these Settlements,'" was read a first time, and the second reading fixed for next meeting of Council.

13. Quarantine Bill.—On the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, the Bill intituled "An Ordinance to make provision for the recovery of expenses incurred in enforcing Quarantine," was read a first time, and the second reading fixed for next meeting of Council.

14. Bill amending Ceylon Railway Ordinance.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to amend the Ordinance No. 10 of 1865, intituled 'An Ordinance relating to the Ceylon Railway,'" was read a first time, and the second reading fixed for next meeting of Council.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned to Wednesday, the 12th October, at 3 o'clock P.M.

Wednesday, 12th October, 1881.

October 12, 1881

1. The Council met puruant to adjournment. His Excellency the Governor took the chair.

2. Members sworn.—The necessary oaths were taken by the Hon. Messrs. Halliley and De Alwis.

3. Proceedings of the last meeting read.

4. Supply Bill, 1882.—The Lieutenant-Governor having obtained the leave of Council to advance it in the Order of the Day, moved the first reading of the Bill intituled "An Ordinance for making provision for the Contingent Services for the year 1882."

Seconded by the Auditor-General.

Bill read a first time, and the second reading fixed for the next meeting of Council.

5. Papers.—The Lieutenant-Governor laid on the table the following papers :—

The Blue Book for 1880.

Sessional Paper XVIII. of 1881.—Railway Extension towards Uva : Further Correspondence relative to the Haputale Section.

Administration Reports (1881), Part I., Revenue :—

Report of the Government Agent, Central Province.

Do. do. North-Central Province.

Part III.—Judicial :—

Statistics, with remarks by the Queen's Advocate.

Report of the Inspector-General of Police.

Part IV.—Miscellaneous :—

Report of the Inspector-General of Prisons.

6. Railway Freights.—Widows' Pension Fund.—The Hon. J. VanLangenberg gave notice that at the next meeting of Council he would

"(1) Call attention to the return by the Traffic Manager, dated 11th November, 1879, of freight recovered on cocoanut traffic forwarded to Kandy and Náwalapitiya from the intermediate stations between Colombo and Polgahawela for 12 months ended 30th September, 1879 ; and move for papers."

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"(2) Ask if any definite decision has been come to regarding the long-contemplated scheme for the establishment of a "Widows' Pension Fund;" and move for papers."

7. POST OFFICE SAVINGS BANKS.—The Hon. P. Ráma-Náthan gave notice that at the next meeting of Council he would

"Move for a Return showing the number of deposits made during the last five years in the Kachchéri Branches of the Ceylon Savings Bank, and ask when the Government intend to give to the inhabitants of the principal towns of Ceylon the boon of Post Office Savings Banks.

8. ADMINISTRATION REPORTS.—The Hon. P. Ráma-Náthan, pursuant to notice, asked

"(1) Why Reports on the administration of the several Departments of the Colony are not furnished to the Council earlier than is now the practice; and (2) why the Council has not received to this day Reports from the following Departments, viz.:—

That of the Government Agent,		Northern Province.
Do.	do.	North-Central Province.
Do.	do.	Central Province.
Do.	do.	North-Western Province.
Do.	do.	Eastern Province.
Do.	do.	Southern Province.
Do.	Prisons.	
Do.	Police.	
Do.	Railway.	
Do.	Queen's Advocate.	
Do.	Registrar-General.	
Do.	District Judges.	

And moved that such Administration Reports be supplied to the Members of this Council not later than August."

Seconded by the Hon. W. W. Mitchell.

The Lieutenant-Governor replied.

Motion by leave withdrawn.

9. COLOMBO WATERWORKS.—The Government Agent, Western Province, pursuant to notice, called attention to the great delay that has occurred in commencing the Colombo Waterworks, and moved for any papers which may have been received on the subject since the date of the Despatches forwarded to the Municipal Council in July last.

Seconded by the Hon. J. VanLangenberg.

The Lieutenant-Governor replied.

Motion agreed to.

10. FRENCH MAIL STEAMERS BILL.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill was read a second time, and the Council having gone into Committee thereon, the Bill was ordered to be referred to a Sub-Committee consisting of the Lieutenant-Governor, the Queen's Advocate, the Principal Collector of Customs, the Hon. Mr. VanLangenberg, the Hon. Mr. Mackwood, and the Hon. Mr. Mitchell.

11. COLOMBO HARBOUR BILL.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill was read a second time, and the Council went into Committee thereon. The Lieutenant-Governor having reported the Bill unamended, it was ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next meeting of Council.

12. ARRACK LICENSE BILL.—On the motion of the Auditor-General, seconded by the Queen's Advocate, the Bill was read a second time, and the consideration of the Bill in Committee was fixed for next meeting of Council.

13. QUARANTINE BILL.—On the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, the Bill was read a second time, and the Council went into Committee thereon. The Queen's Advocate having reported the Bill unamended, it was ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next meeting of Council.

14. BILL AMENDING CEYLON RAILWAY ORDINANCE.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill was read a second time, and the Council went into Committee thereon. The Lieutenant-Governor having reported the Bill unamended, it was ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next meeting of Council.

15. RETURN OF CASH BALANCES.—The Lieutenant-Governor laid on the table the Return of Cash Balances asked for by the Hon. W. W. Mitchell on the 5th October, 1881.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned to Wednesday, the 19th October, at 3 o'clock P.M.

Wednesday, 19th October, 1881.

1. MEMBER SWORN.—The necessary oath was taken by the Hon. J. L. Shand.
2. Proceedings of the last meeting read.
3. PAPERS.—The Lieutenant-Governor laid on the table the following papers :—

   Return to an Order of the Legislative Council, dated 20th October, 1880: "That a return be furnished of Lands that have from time to time been acquired under the *Land Acquisition Ordinance*, No. 3 of 1876."

   Administration Reports (1880), Part I., Revenue :—

   Report of the Government Agent, North-Western Province.
   Do. do. Southern Province.
   Do. do. Eastern Province.
   Do. do. Northern Province.

   Administration Reports (1880), Part IV., Miscellaneous :—

   Reports of the Chief Resident and Locomotive Engineer and of the Finance and Traffic Manager, Ceylon Government Railway.

   Reports of the Registrar-General of Lands and of Marriages, Births and Deaths.
4. PETITION.—The Hon. P. Ráma-Náthan presented a petition from the inhabitants of Kayts, praying that the canal leading to their port may be made of a uniform depth of 12 feet, and moved that it be read by the Clerk of the Council.

   Petition read and ordered to lie on the table.
5. KAYTS HARBOUR.—The Hon. P. Ráma-Náthan gave notice that a fortnight hence he would move

   "In reference to the petition of the inhabitants of Kayts, that a preliminary survey be made of the harbour of that town in order to ascertain whether the dredging of it so as to make it accessible to vessels drawing 12 feet of water, may be undertaken by the Government."
6. NEW LUNATIC ASYLUM.—The Hon. W. W. Mitchell gave notice that at the next meeting of Council he would move

   "That a Commission be appointed to consider the plans of the new Lunatic Asylum, and report how far the portions built can be adapted to the purposes for which the structure was designed; that the Commission be empowered to communicate directly with the Commissioners of Lunacy in England and with Indian and local authorities on Lunacy, to obtain information that may be desired; and that all papers connected with designs, votes for, and construction of a new Lunatic Asylum, together with any reports on the subject from local Medical Officers, be laid upon the table."
7. RAILWAY FREIGHTS.—The Hon. J. Van Langenberg obtained leave of Council to defer the motion on this subject, appearing in his name in the Order of the Day, for next meeting of Council.
8. WIDOWS' PENSION FUND.—The Hon. J. Van Langenberg, pursuant to notice, asked if any definite decision had been come to regarding the long-contemplated scheme for the establishment of a "Widows' Pension Fund;" and moved for papers.

   Seconded by the Hon. W. W. Mitchell.

   The Lieutenant-Governor replied, stating that there were no papers to be given.
9. POST OFFICE SAVINGS BANKS.—The Hon. P. Ráma-Náthan, pursuant to notice, moved for a Return showing the number of deposits made during the last five years in the Kachchéri Branches of the Ceylon Savings Bank, and asked when the Government intended to give to the inhabitants of the principal towns of Ceylon the boon of Post Office Savings Banks.

   Seconded by the Hon. A. L. De Alwis.

   The Lieutenant-Governor replied, and laid on the table the return called for.

   Motion agreed to.
10. SUPPLY BILL, 1882.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill was read a second time, and, the Council having gone into Committee thereon, the Bill was ordered to be referred to a Sub-Committee consisting of the Lieutenant-Governor, the Auditor-General, the Surveyor-General, the Hon. J. Van Langenberg, the Hon. W. W. Mitchell, and the Hon. J. L. Shand.
11. COFFEE STEALING BILL.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to continue the Ordinance No. 2 of 1879, intituled 'An Ordinance to check Coffee Stealing,'" was read a first time, and the second reading fixed for the next meeting of Council.

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12. COLOMBO HARBOUR BILL.—The report of the Law Officers of the Crown, dated the 18th October, 1881, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Auditor-General, read a third time and passed.

13. ARRACK LICENSE BILL.—On the motion of the Auditor-General, seconded by the Lieutenant-Governor, the Council resumed consideration in Committee of the Bill, and it was ordered to be referred to a Sub-Committee consisting of the Queen's Advocate, the Auditor-General, the Government Agent Western Province, the Hon. P. Ráma-Náthan, the Hon. F. M. Mackwood, and the Hon. A. L. De Alwis.

14. QUARANTINE BILL.—The report of the Law Officers, dated the 18th October, 1881, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, read a third time and passed.

15. CEYLON RAILWAY BILL.—The report of the Law Officers of the Crown, dated the 18th October, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned to Wednesday, the 26th October, 1881.

Wednesday, 26th October, 1881.

October 26, 1881.

1. The Council met pursuant to adjournment. His Excellency the Governor took the chair.

2. Proceedings of the last meeting read.

3. ASSENT TO BILLS.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinances :—

No. 1 of 1881, intituled "An Ordinance to amend the Ordinance No. 1 of 1876, intituled 'An Ordinance for the raising by Debentures of a further sum of £400,000 sterling for the improvement of the Colombo Harbour.'"

No. 2 of 1881, intituled "An Ordinance to amend the Ordinance No. 10 of 1865, intituled 'An Ordinance relating to the Ceylon Railway.'"

No. 3 of 1881, intituled "An Ordinance to make provision for the recovery of expenses incurred in enforcing quarantine."

4. PAPERS.—The Lieutenant-Governor laid on the table the following papers :—

Sessional Paper XVII. of 1881.—Coffee Leaf Disease. Third Report by H. Marshall Ward, Esq., with a covering letter from the Director of the Royal Botanic Gardens.

Sessional Paper No. XX. of 1881.—Further Papers relating to the Colombo Waterworks.

5. PETITION.—The Hon. J. VanLangenberg presented a petition from the inhabitants of Mattakuliya, Mádampitiya, Mutwall, and the Pettah, praying for improved means of communication to Mattakuliya, and moved that it be read by the Clerk of the Council.

Seconded by the Hon. A. L. De Alwis.

Petition read.

6. AGENCIES AND ASSISTANT AGENCIES.—The Hon. P. Ráma-Náthan gave notice that at the next meeting of Council he would move for a return showing

"1.—The number of Agencies and Assistant Agencies.
2.—The salaries attached to each of those Agencies.
3.—The batta drawn during the last two years by such Agents and Assistant Agents.
4.—The other appointments usually held by such Agents and Assistant Agents simultaneously with their own.
5.—The fees drawn by them by virtue of such additional appointments."

7. ORDINANCE PROVIDING FOR THE INCORPORATION OF CHURCH BODY.—The Hon. W. W. Mitchell gave notice that at the next meeting of Council he would ask

"When Government propose to introduce the Ordinance referred to in section 8 of the Despatch of the Secretary of State, dated 19th November last, providing for the incorporation of the Church Body by which the affairs of the Church of England in Ceylon may be administered, and move for papers.

FORT RAILWAY STATION.—The Hon. W. W. Mitchell gave notice that at the next meeting of Council he would move

"That steps be taken to improve the accommodation at the Fort Railway Station."

9. RAILWAY FREIGHTS.—The Hon. J. VanLangenberg, pursuant to notice, called attention to the return by the Traffic Manager, dated 11th November, 1879, of freight recovered on cocoanut traffic forwarded to Kandy and Náwalapitiya from the intermediate stations between Colombo and Polgahawela for 12 months ended 30th September, 1879; and moved for papers.

Seconded by the Hon. W. W. Mitchell.

The Lieutenant-Governor replied, stating that there were no papers to be given.

10. NEW LUNATIC ASYLUM.—The Hon. W. W. Mitchell obtained leave to defer for next meeting of Council the motion on this subject appearing in his name in the Order of the Day.

11. CAUSEWAY AT ELEPHANT PASS.—The Hon. P. Ráma-Náthan, having obtained leave of Council to omit the words "and to move for papers," pursuant to notice, asked for information regarding the causeway at Elephant Pass.

The Lieutenant-Governor replied.

12. ARRACK LICENSE BILL.—The Queen's Advocate brought up the report of the Sub-Committee on the Bill, which was read by the Clerk of the Council, and the further consideration of the Bill in Committee was fixed for Wednesday, the 16th November.

13. COFFEE STEALING BILL.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill was read a second time, and the Council went into Committee thereon. The Lieutenant-Governor having reported the Bill unamended, it was ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next meeting of Council.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned to Wednesday, the 2nd November, at 3 o'clock P.M.

Wednesday, 2nd November, 1881.

Nov. 2, 1881

1. The Council met pursuant to adjournment. His Excellency the Governor took the chair.
2. Proceedings of the last meeting read.
3. PAPERS.—The Lieutenant-Governor laid on the table the following papers:—

   Draft Code for Grant-in-aid Schools for 1882.

   Sessional Paper XXII. of 1881.—Report of the Committee of the Chamber of Commerce on the Harbour Works scheme.

   Sessional Paper XXIII. of 1881.—Papers on the working of the Game Ordinance.

   Administration Reports (1880), Part IV., Miscellaneous:—

   Report of the Principal Civil Medical Officer and Inspector-General of Hospitals.

4. GIANT'S TANK.—The Hon. P. Ráma-Náthan presented a memorial from certain inhabitants of the District of Mannár asking that the restoration of the Giant's tank may be undertaken as soon as possible.

5. CATALOGUE OF ORIENTAL WORKS.
6. APPOINTMENT OF BRAHAMINS AS VILLAGE REGISTRARS.

The Hon. P. Ráma-Náthan gave notice of the following motions for the next meeting of Council:—

"(1) To ask for information regarding the Catalogue of Oriental Works begun under the Administration of Sir H. Robinson, and to move for papers."

"(2) To point out, in reference to the marriages of non-Christian Tamils in the Northern Province, the desirability of appointing Brahamins as Village Registrars, and to move for papers."

7. GOVERNMENT CIVIL HOSPITALS.
8. NÁNU-OYA RAILWAY.

The Hon. J. L. Shand gave notice of the following motions for next meeting of Council:—

"(1) To move for a return of all Government Civil Hospitals in the Island outside the provincial capitals, with the cost of maintaining the same, and a list of the public officers in charge."

"(2) To move that the Chief Resident Engineer be asked to report the per-centage of the various works which has been done by the railway contractor to Hatton and Nánu-oya severally to end of October, the probable rate at which these works can be respectively completed, and the saving, if any, which is likely to be effected by the rates and quantities being within Government estimates."

9. HARBOUR OF KAYTS.—The Hon. P. Ráma-Náthan, pursuant to notice, moved in reference to the petition of the inhabitants of Kayts, that a preliminary survey be made of the harbour of that town, in order to ascertain whether the dredging of it so as to make it accessible to vessels drawing 12 feet of water may be undertaken by the Government.

Seconded by the Hon. W. W. Mitchell.
The Lieutenant-Governor replied.
Motion by leave withdrawn.

LEGISLATIVE COUNCIL.

Proceedings.

Nov 2, 1881.

10. New Lunatic Asylum.—The Hon. W. W. Mitchell, pursuant to notice, moved that a Commission be appointed to consider the plans of the new Lunatic Asylum, and report how far the portions built can be adapted to the purposes for which the structure was designed; that the Commission be empowered to communicate directly with the Commissioners of Lunacy in England and with Indian and local authorities on Lunacy, to obtain information that may be desired; and that all papers connected with designs, votes for, and construction of a new Lunatic Asylum, together with any reports on the subject from local Medical Officers, be laid upon the table.

Seconded by the Hon. F. M. Mackwood.
The Lieutenant-Governor replied.
The motion having, by leave of Council, been amended so as to run thus :—

"That a Commission be appointed to report how many patients can be accommodated in the portion of the new Lunatic Asylum already built, and what temporary modifications of the plans or additions thereto are desirable in order to accommodate the greatest number of patients, and that all papers connected with the designs, votes for, and construction of a new Lunatic Asylum, together with any reports on the subject from local Medical Officers, be laid on the table."

was agreed to.

11. Agencies and Assistant Agencies.—The Hon. P. Ráma-Náthan, pursuant to notice, moved for a return showing—

1.—The number of Agencies and Assistant Agencies.
2.—The salaries attached to each of those Agencies.
3.—The batta drawn during the last two years by such Agents and Assistant Agents.
4.—The other appointments usually held by such Agents and Assistant Agents simultaneously with their own.
5.—The fees drawn by them by virtue of such additional appointments.

Seconded by Hon. A. L. De Alwis.
The Lieutenant-Governor replied.
Motion agreed to.

12. Fort Railway Station.—The Hon. W. W. Mitchell, pursuant to notice, moved that steps be taken to improve the accommodation at the Fort Railway Station.

Seconded by the Hon. J. VanLangenberg.
The Lieutenant-Governor replied.
Motion agreed to.

13. Ordinance providing for the incorporation of the Church Body.—The Hon. W. W. Mitchell, pursuant to notice, asked when Government propose to introduce the Ordinance referred to in section 8 of the despatch of the Secretary of State, dated 19th November last, providing for the incorporation of the Church Body by which the affairs of the Church of England in Ceylon may be administered; and moved for papers.

Seconded by the Hon. F. M. Mackwood.
The Lieutenant-Governor replied, and stated there were no papers to produce.

14. Medical Wants Ordinance, 1880.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to amend the Medical Wants Ordinance, 1880," was read a first time, and the second reading was fixed for the 23rd November.

15. Ordinance to amend the Stamp Ordinances Nos. 8 of 1863 and 3 of 1865.—On the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, the Bill intituled "An Ordinance to amend the Ordinance No. 8 of 1863 and the Ordinance No. 3 of 1865," was read a first time, and the second reading fixed for next meeting of Council.

16. Coffee Stealing Ordinance.—The report of the Law Officers of the Crown dated the 31st October, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Wednesday, the 16th November, at 3 P.M.

Wednesday, 16th November, 1881.

Nov. 16, 1881.

1. The Council met pursuant to adjournment. His Excellency the Governor took the chair.
2. Proceedings of the last meeting read.

3. ASSENT TO BILL.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinance :—

No. 4 of 1881, intituled "An Ordinance to continue the Ordinance No. 2 of 1879 intituled 'An Ordinance to check Coffee Stealing.'"

4. PAPER.—The Lieutenant-Governor laid on the table the following paper :—

Translations of the Ancient Inscriptions in the Museum by Dr. E. Müller.

5. PETITION.—The Hon. P. Ráma-Náthan presented a petition from certain inhabitants of Colombo, Henaratgoda, Véyangoda, Mírigama, Polgahawela, Kurunégala, and Kégalla, praying that the train which now leaves Véyangoda at 7 A.M. should start at that hour from Polgahawela, and also that the train leaving in the evening at 5 P.M. should proceed to Polgahawela instead of stopping at Véyangoda; and gave notice that he would call attention to the petition a fortnight hence.

6. GRAIN TAX ORDINANCE.—The Hon. A. L. De Alwis gave notice that at the next meeting of Council he would move, with reference to clause No. 18 of the Grain Tax Ordinance No. 11 of 1878, for a return showing the number of defaulters, the different sums for which they have made default, the lands seized and sold in consequence of such default, the approximate extent of such lands, the several sums they realized, and the names of the purchasers.

7. MEDICAL AID ORDINANCE NO. 14 OF 1872.—The Hon. J. L. Shand gave notice that at the next meeting of Council he would move "For the correspondence, if any, connected with the introduction and working of the Medical Aid Ordinance No. 14 of 1872, which has passed between the Indian and Ceylon Governments, and call for all correspondence between the Secretary of State for the Colonies and the Ceylon Government, referring to the Ordinance No. 17 of 1880."

8. ORDINANCE RELATING TO THE REGISTRATION OF TITLES TO LAND.—The Hon. P. Ráma-Náthan gave notice that at the next meeting of Council he would ask what measures the Government have taken, and if they have not taken measures, to bring into operation in certain parts of the Island, at least, the Ordinance No. 5 of 1877, relating to the registration of titles to land; and move for papers.

9. WITHDRAWAL OF ECCLESIASTICAL SUBSIDIES.—His Excellency the Governor stated that with reference to certain papers laid upon the table relative to the withdrawal of religious subsidies, in reply to a memorial from the Presbytery of the Scotch Presbyterian Church the Secretary of State had authorized His Excellency to propose to the Council that the years of grace to be allowed to the Churches should be dated from the 1st of July instead of from the 1st of January last. His Excellency added that a copy of the Secretary of State's despatch and the papers referred to in it would be laid on the table.

10. COLOMBO BREAKWATER.—The Lieutenant-Governor pursuant to notice, moved

"That this Council adopt the proposal of Sir John Coode in Design B. for the southern arm of the Breakwater at an estimated cost of £712,593.

"Inasmuch as the estimate for the northern arm, £198,046, when added to that of the southern arm, exceeds by £110,638 the limit fixed by a resolution of this Council for the total expenditure upon the Colombo Harbour Works, it becomes necessary to ascertain whether any further reduction could not be made in the estimates now before the Council; and that enquiry be made of Sir J. Coode what saving in cost could be effected by limiting the use of béton blocks on the northern arm to an extent of three hundred feet from the western head of the arm, the rest of the arm being constructed of *pierres perdues* by means of prison labour.

"And whether a northern arm so constructed would not possess the necessary conditions of stability, having regard to the fact that it would be protected from the south-west monsoon, and that the sea of the north-east monsoon is not such as to require the solid and expensive class of work necessary for the southern arm."

Seconded by the Hon. W. W. Mitchell.

Motion agreed to.

11. COLOMBO BREAKWATER.—The Hon. W. W. Mitchell having obtained leave of Council to insert after the words £800,000 the words "if it be resolved to carry out the Consulting Engineer's final design," pursuant to notice, moved

"That in view of the inability of the colony to afford to spend a larger sum than £800,000 on a complete Harbour Scheme, such as that proposed by Sir J. Coode, and the fact that ships of Her Majesty's Navy as well as Mail Steamers will be accommodated by it, the Imperial Government be asked to contribute such amount as may be required beyond £800,000 if it be resolved to carry out the Consulting Engineer's final design.

Seconded by the Hon. J. VanLangenberg.

THE COUNCIL DIVIDED.

Ayes.	*Noes.*
The Hon. J. L. Shand,	The Hon. F. M. Mackwood,
The Hon. A. L. De Alwis,	The Surveyor-General,
The Hon W. W. Mitchell,	The Major-General.
The Hon. J. VanLangenberg,	
The Hon. the Principal Collector of Customs,	
The Government Agent, Western Province,	
The Treasurer,	
The Auditor-General,	
The Queen's Advocate,	
The Lieutenant-Governor.	

Ayes 10; Noes 3; Majority 7.—Motion carried.

12. CATALOGUE OF ORIENTAL WORKS.—The Hon. P. Ráma-Náthan, pursuant to notice, asked for information regarding the Catalogue of Oriental Works begun under the Administration of Sir H. Robinson; and moved for papers.

Seconded by the Hon. A. L. De Alwis.

The Lieutenant-Governor replied. Motion agreed to.

13. APPOINTMENT OF BRAHAMINS AS VILLAGE REGISTRARS.—The Hon. P. Ráma-Náthan having obtained leave of Council to insert the words "or other Hindus" after "Tamils," pursuant to notice, pointed out in reference to the marriages of non-Christian Tamils in the Northern Province the desirability of appointing Brahamins or other Hindus as Village Registrars: and moved for papers.

Seconded by the Hon. A. L. De Alwis.

The Lieutenant-Governor replied, and laid on the table a return of all Registrars in Northern Province.

14. RETURN OF GOVERNMENT CIVIL HOSPITALS.—The Hon. J. L. Shand, pursuant to notice, moved for a return of all Government Civil Hospitals in the Island outside the provincial capitals, with the cost of maintaining the same, and a list of the public officers in charge."

Seconded by the Hon. F. M. Mackwood.

The Lieutenant-Governor replied. Motion agreed to.

15. NÁNU-OYA RAILWAY.—The Hon. J. L. Shand, pursuant to notice, moved that the Chief Resident Engineer be asked to report the per-centage of the various works which have been done by the railway contractor to Hatton and Nánu-oya severally to end of October, the probable rate at which these works can be respectively completed, and the saving, if any, which is likely to be effected by the rates and quantities being within Government estimates.

Seconded by the Hon. F. M. Mackwood.

The Lieutenant-Governor replied, and laid on the table a letter from the Chief Resident Engineer. The words subsequent to "October" having by leave of Council been omitted, the motion was greed to.

16 VOLUNTEER BILL.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled

"An Ordinance to amend the Ordinance No. 3 of 1861 intituled 'An Ordinance to authorize the formation of a Volunteer Corps in this Colony, and to provide for the good order and discipline thereof'" was read a first time, and the second reading fixed for the next meeting of Council.

17 ORDINANCE TO AMEND THE STAMP ORDINANCES Nos. 8 OF 1863 AND 3 OF 1865.—On the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, the Bill was read a second time, and the Council having gone into Committee thereon the Bill was ordered to be referred to a Sub-Committee consisting of the Queen's Advocate, the Treasurer, the Government Agent, Western Province, the Hon. J. VanLangenberg, the Hon. P. Ráma-Náthan, and the Hon. W. W. Mitchell.

18 ARRACK LICENSE BILL.—On the motion of the Auditor-General, seconded by the Lieutenant-Governor, the Council resumed consideration of the Bill in Committee. The Auditor-General having reported the Bill with amendment, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

19. SUPPLY BILL, 1882.—The Lieutenant-Governor obtained leave of Council to defer consideration of this Bill until next meeting.

20. FRENCH MAIL STEAMERS BILL.—The Lieutenant-Governor brought up the report of the Sub-Committee on the Bill, which was read by the Clerk of the Council, and the consideration of the Bill in Council was fixed for next meeting of Council.

Wednesday, 23rd November, 1881.

1. The Council met pursuant to adjournment. His Excellency the Governor took the chair.
2. Proceedings of the last meeting read.
3. APPROACHING VISIT TO CEYLON OF THEIR ROYAL HIGHNESSES PRINCE ALBERT VICTOR AND PRINCE GEORGE.—His Excellency the Governor addressed the Council as follows :—

   "I am glad to be enabled to announce to the Council that their Royal Highnesses Prince Albert Victor and Prince George, sons of the Prince of Wales, will visit Ceylon early next year, and I am sure that they will be received by the people of Ceylon with a hearty welcome. The *Bacchante* is due in Colombo on the 27th of January, and will remain here some days."

4. MEMORIAL.—The Government Agent of the Western Province presented a memorial from certain resident proprietors living within 10 miles of the railroad between Véyangoḍa and Colombo, praying that the additional passenger train running between these places may not be withdrawn, and gave notice that he intended to call attention to the subject seven days hence.
5. PETITION.—The Hon. P. Ráma-Náthan presented a petition from certain inhabitants of the Munnesaram and A'naiviluntán pattús of Chilaw District, praying for the erection of a bank across the Ḍeḍuru-oya to irrigate their fields.
6. PAPERS.—The Lieutenant-Governor laid on the table the following papers :—

   Sessional Paper XXVI. of 1881.—Return to an Order of the Legislative Council dated 16th November, 1881 : "That a return be furnished of all Government Civil Hospitals in the Island outside the provincial capitals, and the cost of maintaining the same, and a list of public officers in charge."

   Further Papers on the subject of Ecclesiastical Subsidies.

   Numerical Abstract of the inhabitants resident within the several Provinces of the Island liable to the performance of labour under the Ordinance No. 10 of 1861 for the year 1882.

   Statements showing the amounts of Schedule fees received by the Fiscals of the several Provinces agreeably to the 16th clause of Ordinance No. 4 of 1867, during the quarters ended 30th September and 31st December, 1880, and 31st March and 30th June, 1881.

7. RETURN UNDER THE GRAIN TAX ORDINANCE.—The Hon. A. L. De Alwis, pursuant to notice, moved with reference to clause No. 18 of the Grain Tax Ordinance No. 11 of 1878, for a return showing the number of defaulters, the different sums for which they have made default, the lands seized and sold in consequence of such default, the approximate extent of such lands, the several sums they realized, and the names of the purchasers.

   Seconded by the Hon. P. Ráma-Náthan.

   The Lieutenant-Governor replied and laid upon the table the desired return.

8. MEDICAL ORDINANCES NOS. 14 OF 1872 AND 17 OF 1880.—The Hon. J. L. Shand, pursuant to notice, moved for the correspondence, if any, connected with the introduction and working of the Medical Aid Ordinance, No. 14 of 1872, which had passed between the Indian and Ceylon Governments; and called for all correspondence between the Secretary of State for the Colonies and the Ceylon Government referring to the Ordinance No. 17 of 1880.

   Seconded by the Hon. W. W. Mitchell.

   The Lieutenant-Governor replied, stating that there was no correspondence with the Government of India relative to Ordinance No. 14 of 1872, and laying on the table the correspondence with the Secretary of State referring to Ordinance No. 17 of 1880.

9. ORDINANCE NO. 5 OF 1877, RELATING TO THE REGISTRATION OF TITLES TO LAND.—The Hon. P. Ráma-Náthan obtained leave of Council to defer for next week the following motion of which he had given notice :—

   "To ask what measures the Government have taken, and, if they have not, why they have not taken measures, to bring into operation, in certain parts of the Island at least, the Ordinance No. 5 of 1877 relating to the registration of titles to land ; and to move for papers."

10. MEDICAL INSPECTION OF TAMIL IMMIGRANT LABOURERS. MEDICAL ORDINANCE NO. 17 OF 1880. — The Hon. J. L. Shand having obtained leave of Council to make certain alterations in the motions of which he and the Hon. W. W. Mitchell had given notice, moved the following motions :—

    "That special taxation, in any form, for providing medical officers for inspecting Tamil immigrant labourers or inspection of estates in the Colony is inexpedient, and that medical treatment and supervision be administered by the Civil Medical Department, the cost of same being defrayed out of the general revenue to the extent that it shall exceed that which may be recovered from superintendents and labourers who avail themselves of the hospital, and other special services furnished by the Department; and

"That a Memorial be addressed by this Council to Her Most Gracious Majesty the Queen, praying that Her Majesty may be graciously pleased to cause Ordinance No. 17 of 1880, intituled 'An Ordinance to provide for the Medical Wants of Immigrant Labourers in certain Planting Districts,' to be repealed."

Seconded by the Hon. W. W. Mitchell.

The Lieutenant-Governor replied.

THE COUNCIL DIVIDED.

Ayes.	*Noes.*
The Hon. J. L. Shand,	The Hon. A. L. De Alwis,
The Hon. W. W. Mitchell,	The Hon. F. M. Mackwood,
	The Hon. P. Ráma-Náthan,
	The Hon. J. VanLangenberg,
	The Principal Collector of Customs,
	The Surveyor-General,
	The Government Agent, Central Province,
	The Government Agent, Western Province,
	The Treasurer,
	The Auditor-General,
	The Queen's Advocate,
	The Major-General,
	The Lieutenant-Governor,
	His Excellency the Governor.

Ayes 2; Noes 14; Majority 12.—Motion lost.

11. BILL TO AMEND THE MEDICAL WANTS ORDINANCE, 1880.—The Lieutenant-Governor moved the second reading of the Bill, which was seconded by the Queen's Advocate.

THE COUNCIL DIVIDED.

Ayes.	*Noes.*
The Hon. J. VanLangenberg,	The Hon. J. L. Shand,
The Principal Collector of Customs,	The Hon. A. L. De Alwis,
The Surveyor-General,	The Hon. W. W. Mitchell,
The Government Agent, Central Province,	The Hon. F. M. Mackwood,
The Government Agent, Western Province,	The Hon. P. Ráma-Náthan.
The Treasurer,	
The Auditor-General,	
The Queen's Advocate,	
The Major-General,	
The Lieutenant-Governor,	
His Excellency the Governor.	

Ayes 11; Noes 5; Majority 6.—Motion carried.

Bill read a second time.

The Council having gone into Committee on the Bill it was, on the motion of the Lieutenant-Governor, referred to a Sub-Committee consisting of the Lieutenant-Governor, the Queen's Advocate, the Government Agent, Central Province, the Hon. P. Ráma-Náthan, the Hon. W. W Mitchell, the Hon. J. L. Shand.

12. ARRACK BILL.—The report of the Law Officers of the Crown dated the 22nd November, 1881, reporting that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill intituled "An Ordinance to amend the Ordinance No. 10 of 1844, intituled 'An Ordinance to amend the law relative to the distillation and sale of arrack, rum, and toddy within these settlements,'" having been read, the Bill was, on the motion of the Auditor-General, read a third time and passed.

13. VOLUNTEER ORDINANCE.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to amend the Ordinance No. 3 of 1861, intituled 'An Ordinance to authorize the formation of a Volunteer Corps in this Colony, and to provide for the good order and discipline thereof,'" was read a second time, and the Council went into Committee on the Bill. The Lieutenant-Governor reported progress, and further consideration of the Bill was deferred till next week.

14. FRENCH MAIL STEAMERS BILL.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, Council resumed consideration of the Bill in Committee. The Lieutenant-Governor having reported the Bill unamended the report was adopted, and the Bill, was ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next week's meeting of Council.

15. VOLUNTEER ORDINANCE.—On the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, the Bill intituled "An Ordinance to amend the Ordinance No. 3 of 1861, intituled 'An Ordinance to authorize the formation of a Volunteer Corps in this Colony, and to provide for the good order and discipline thereof,'" was read a first time, and the second reading fixed for next week's meeting of Council.

16. SUPPLEMENTARY SUPPLY BILL, 1881.—The Lieutenant-Governor obtained leave of Council to defer for next day's meeting the first reading of the Bill: "An Ordinance for making provision for the Supplementary Contingent Charges for the year 1881."

Nov. 23, 1881.

17. ORDINANCE AMENDING FIXED CIVIL ESTABLISHMENT ORDINANCE, No. 1 of 1870.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance to amend the Ordinance No. 1 of 1870, intituled 'An Ordinance relating to the Fixed Civil Establishments of this Colony," was read a first time, and the second reading fixed for next week's meeting of Council.

18. BILL PROVIDING FOR THE APPOINTMENT OF INCORPORATED TRUSTEES OF THE CHURCH OF ENGLAND IN CEYLON.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Bill intituled "An Ordinance for the appointment of Incorporated Trustees of the Church of England in Ceylon," was read a first time, and the second reading fixed for next week's meeting of Council.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Thursday, the 24th November, at 3 o'clock P.M.

Thursday, 24th November, 1881.

Nov 24, 1881.

1. The Council met pursuant to adjournment. His Excellency the Governor took the chair.
2. Proceedings of the last meeting read.
3. SUPPLEMENTARY SUPPLY BILL, 1881.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill intituled "An Ordinance for making provision for the Supplementary Contingent Charges for the year 1881" was read a first time, and the second reading fixed for the next meeting of Council.
4. SUPPLY BILL, 1882.—The Lieutenant-Governor brought up the report of the Sub-Committee on the Bill, which was read by the Clerk of the Council. The Council having gone into Committee on the Bill, it was ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Wednesday, the 30th instant, at 3 o'clock P.M.

Wednesday, 30th November, 1881.

Nov 30, 1881.

1. The Council met pursuant to adjournment. His Excellency the Governor took the chair.
2. Proceedings of the last meeting read.
3. ASSENT TO BILL.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinance:—

   Ordinance No. 5 of 1881, intituled "An Ordinance to amend the Law relative to the Distillation and Sale of Arrack, Rum, and Toddy, within these Settlements."

4. OBSERVATIONS OF THE WINDS, WAVES AND TIDES AT COLOMBO.—The Hon. F. M. Mackwood gave notice of the following motion for next meeting of Council:—

   "To move for a return showing the observations made during the years 1878, 1879, 1880, and 1881 of the winds, waves, and tides at Colombo, particularly referred to by the Resident Engineer of the Harbour Works in his letter to the *Observer* on the 19th instant; the return to state the position of the floating gauge used for measuring the tides from May, 1878, to July, 1879, the relative position of the gauge from the works at the head of the Breakwater, and whether it was inside or outside the rubble mound; also the dates on which work was interrupted or suspended at the head of the Breakwater during the last three seasons, and from what cause."

5. REORGANIZATION OF THE QUEEN'S ADVOCATE'S DEPARTMENT.—SALT COLLECTION.—The Hon. P. Ráma-Náthan gave notice of the two following motions for next meeting of Council:—

   "To move that Sir John Phear's Memorandum on the Queen's Advocate's Department (to which he refers in his Memorandum on the Draft Ordinance on Criminal Procedure) and all other papers which have passed between Government and Public Officers in and out of Ceylon in regard to the reorganization of that Department, be laid on the table."

   "In reference to the item of Rs. 144,200 (expenses of salt collection) appearing in the Supplementary Supply Bill, to ask (1) whether strikes among the salt manufacturers of Puttalam against the Government have occurred before 1880, and if not, to what cause the strike of 1880 was due; (2) also, whether the revenue of the colony has suffered by the strike, and if so, to what extent approximately; and to move for papers."

6. BILL RELATING TO THE REGISTRATION OF TITLES TO LAND.—The Hon. P. Ráma-Náthan, pursuant to notice, asked what measures the Government had taken, and, if they had not, why they had not taken measures, to bring into operation, in certain parts of the Island at least, the Ordinance No. 5 of 1877 relating to the registration of titles to land; and moved for papers.

Seconded by the Hon. J. VanLangenberg.

The Lieutenant-Governor replied.

7. LOCAL TRAINS.—The Hon. P. Ráma-Náthan, pursuant to notice, called attention to the petition presented by him on the 16th November from certain inhabitants of Colombo, Henaratgoḍa, Véyangoḍa, Mírigama, Polgahawela, Kurunégala, and Kégalla, praying that the train which now leaves Véyangoḍa at 7 A.M. should start at that hour from Polgahawela, and also that the train leaving in the evening at 5 P.M. should proceed to Polgahawela instead of stopping at Véyangoḍa.

Seconded by the Hon. A. L. De Alwis.

The Lieutenant-Governor replied.

8. LOCAL TRAINS.—The Government Agent, Western Province, pursuant to notice, called attention to the contents of a memorial presented on the 23rd instant by certain landed proprietors resident in the vicinity of the railway between Colombo and Véyangoḍa; and moved for papers.

Seconded by the Hon. J. VanLangenberg.

The Lieutenant-Governor replied.

9. STEAMER "SERENDIB."—The Hon. F. M. Mackwood, pursuant to notice, moved for a return showing the original cost of the S. S. *Serendib;* the number of times she had been repaired, together with cost of such repairs; of all other sums expended annually on account of her maintenance and outfit; also for a return showing her annual earnings since purchase by this Colony.

Seconded by the Hon. P. Ráma-Náthan.

The Lieutenant-Governor replied.

Motion agreed to.

10. MUNICIPAL COUNCILS BILL.—On the motion of the Queen's Advocate, seconded by the Government Agent, Western Province, the Bill intituled "An Ordinance to amend 'The Municipal Councils Ordinance, 1865,' and for other purposes" was read a first time, and the second reading fixed for next meeting of Council.

11. TOLL ORDINANCE.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill intituled "An Ordinance to establish further Tolls and to discontinue certain Tolls" was read a first time, and the second reading fixed for next meeting of Council.

12. LOAN BOARD ORDINANCE.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill intituled "An Ordinance to amend Ordinance No. 4 of 1879, intituled 'An Ordinance to provide for the further appropriation of certain unclaimed balances from the funds of the Loan Board'" was read a first time, and the second reading fixed for next meeting of Council.

13. FINAL SUPPLEMENTARY SUPPLY BILL, 1880.—On the motion of the Auditor-General, seconded by the Lieutenant-Governor, the Bill intituled "An Ordinance for making final provision for the Supplementary Contingent Charges for the year 1880" was read a first time, and the second reading fixed for next meeting of Council.

14. FRENCH MAIL STEAMERS BILL.—The report of the Law Officers of the Crown dated 28th November, 1881, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

15. SUPPLY BILL, 1882.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill was re-committed. The Bill having been amended and the report of the Law Officers of the Crown, dated 29th November, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was read a third time and passed.

16. SUPPLEMENTARY SUPPLY BILL, 1881.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill was read a second time, and the Council went into Committee on the Bill. In Committee the Bill was referred to a Sub-Committee, consisting of the Lieutenant-Governor, the Auditor-General, the Principal Collector of Customs, the Hon. P. Ráma-Náthan, the Hon. F. M. Mackwood, and the Hon. A. L. De Alwis.

17. VOLUNTEER BILL.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, the Council in Committee resumed consideration of the Bill. The Lieutenant-Governor having reported the Bill as amended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

18. VOLUNTEER BILL.—On the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, the Bill was read a second time and the Council went into Committee thereon. The Queen's Advocate having reported the Bill as amended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

19. BILL PROVIDING FOR THE APPOINTMENT OF INCORPORATED TRUSTEES OF THE CHURCH OF ENGLAND IN CEYLON. BILL AMENDING FIXED CIVIL ESTABLISHMENTS ORDINANCE, NO. 1 OF 1870.—On the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, these two Bills were read a second time, and referred to a Sub-Committee, consisting of the Lieutenant-Governor, the Queen's Advocate, the Auditor-General, the Hon. F. M. Mackwood, the Hon. W. W. Mitchell, and the Hon. A. L. De Alwis.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Wednesday, the 7th December, at 3 o'clock P.M.

Wednesday, 7th December, 1881.

Dec. 7, 1881.

1. The Council met pursuant to adjournment.—His Excellency the Governor took the chair.
2. Proceedings of the last meeting read.
3. RAILWAY STATION AT MI'RIAGAMA.—POST OFFICE SAVINGS BANKS.—The Hon. P. Ráma-Náthan gave notice of the following motions for next meeting of Council :—

"To call attention to the newly-built Railway Station at Míriagama, and to move that its waiting-room be furnished."

"Referring to the readiness of the Postmaster-General to bring Post Office Savings Banks into operation in the course of next year (as expressed in his report for 1880), to move that Savings Banks be established in connection with the Post Offices now existing in the following places :—

Western Province.

Aranáyaka	Já-ela	Negombo
Avisáwélla	Kalutara	Pánaduré
Balaṇgoḍa	Kégalla	Rakwána
Béruwala	Kóṭṭé	Ratnapura
Colombo Courts	Kollupiṭiya	Slave Island
Galkissa	Maradána	Véyangoḍa
Grandpass	Moraṭuwa	
Haṇwella	Mutwal	

North-Western Province.

Chilaw	Kurunégala	Polgahawela
Kalpiṭiya	Mádampé	Puttalam

Central Province.

Ambagamuwa	Kotmalé	Nuwara Eliya
Badulla	Lunugala	Pussellâwa
Gampola	Maḍawelaṭenna	Ramboḍa
Haldummulla	Maturaṭa	Rattoṭa
Kaḍugannáwa	Mátalé	
Kandy	Náwalapiṭiya	

Southern Province.

Baddégama	Doḍandúwa	Hikkaḍuwa
Balapiṭimódara	Galle	Mátara
Bentoṭa	Hambantoṭa	Taṇgalla

Eastern Province

Batticaloa | Trincomalee

North-Central Province.

Anurádhapura

Northern Province.

Vaḍḍukóḍḍai	Kayts	Pallai
Chávakachchéri	Kóppái	Point Pedro
Jaffna	Mannár	Uḍuvil
Kánkésanturai	Mullaittívu	

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LEGISLATIVE COUNCIL.
Proceedings.
Dec. 7, 1881

4. LAW RELATING TO CONTRACTS, AND THE LAW OF TORTS AND DAMAGES. GRAVING DOCK AT LOTUS POND.—The Hon. W. W. Mitchell gave notice of the following motions for next meeting of Council:—

"To ask if it is the intention of Government to introduce this Session a measure substituting English Law instead of Roman-Dutch Law in relation to Contracts, and the law of Torts and Damages, and if not, why not; and to move for papers."

"To move that steps be taken to ascertain from Sir John Coode what the cost would be of providing Colombo with a suitable graving dock at the Lotus pond, or at some equally convenient site; also, what would be the cost of a patent slip to accommodate vessels up to 1,500 tons register; and, further, what an hydraulic floating dock would cost to lift ships of the same tonnage."

5. MINING AND MINERAL RIGHTS.—HAPUTALÉ SECTION OF THE RAILWAY.—The Hon. J. L. Shand gave notice of the following motions for next meeting of Council:—

"To ask what steps Government intend to take to determine the position of proprietors of land in Ceylon with reference to mining and mineral rights; and to call for papers?"

"That as the debt on the Kandy-Colombo railway will next year be fully liquidated, and in view of the fact that the further extension to Haputalé is essential to ensure the financial success of the Nánu-oya section now under construction, this Council do urge upon the Secretary of State for the Colonies the necessity in the general interests of the Island of immediately sanctioning the commencement of the Haputalé section."

6. ASSENT TO BILLS.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinances:—

No. 6 of 1881, intituled "An Ordinance for making provision for the Contingent Services for the year 1882."

No. 7 of 1881, intituled "An Ordinance to make temporary provision for securing the status of French Mail Steamers within the Ports of this Colony."

7. PAPERS.—The Lieutenant-Governor laid on the table the following papers:—

Return to an Order of the Legislative Council dated 16th November, 1881: "That a statement showing the per-centage of the various works which have been done by the Railway Contractor to Hatton and Nánu-oya severally, to the end of October, 1881, be furnished." (Moved for by the Hon J. L. Shand.)

Return to an Order of the Legislative Council dated 30th November, 1881: "That a return be furnished showing the original cost of the S. S. *Serendib;* the number of times she has been repaired, together with cost of such repairs; of all other sums expended annually on account of her maintenance and outfit; also a return showing her annual earnings since purchase by this Colony." (Moved for by the Hon. F. M. Mackwood.)

8. OBSERVATIONS OF THE WINDS, WAVES, AND TIDES AT COLOMBO.—The Hon. F. M. Mackwood, pursuant to notice, moved for a return showing the observations made during the years 1878, 1879, 1880, and 1881, of the winds, waves and tides at Colombo, particularly referred to by the Resident Engineer of the Harbour Works in his letter to the *Observer* on the 19th instant; the return to state the position of the floating gauge used for measuring the tides from May, 1878, to July, 1879, the relative position of the gauge from the works at the head of the Breakwater, and whether it was inside or outside the rubble mound; also the dates on which work was interrupted or suspended at the head of the Breakwater during the last three seasons, and from what cause.

Seconded by the Hon. P. Ráma-Náthan.

The Lieutenant-Governor replied, and laid on the table the return called for.

9. SALT COLLECTION.—The Hon. P. Ráma-Náthan, pursuant to notice, asked in reference to the item of Rs. 144,200 (expenses of salt collection) appearing in the Supplementary Supply Bill: (1) whether strikes among the salt manufacturers of Puttalam and the Government have occurred before 1880, and if not, to what cause the strike of 1880 was due; (2) also, whether the revenue of the Colony has suffered by the strike, and, if so, to what extent approximately; and moved for papers.

Seconded by the Hon. F. M. Mackwood.

The Lieutenant-Governor replied, and laid on the table a return complete up to 2nd December, 1881, of the receipts from and expenditure on imported salt.

10. REORGANIZATION OF THE QUEEN'S ADVOCATE'S DEPARTMENT.—The Hon. P. Ráma-Náthan, pursuant to notice, moved that Sir John Phear's Memorandum on the Queen's Advocate's Department (to which he refers in his Memorandum on the Draft Ordinance on Criminal Procedure) and all other papers which have passed between Government and Public Officers in and out of Ceylon in regard to the reorganization of that Department, be laid on the table.

Seconded by the Hon. A. L. De Alwis.

The Lieutenant-Governor replied.

11. BILL TO AMEND THE MUNICIPAL COUNCILS BILL, 1865.—On the motion of the Queen's Advocate, seconded by the Government Agent, Western Province, the Bill was read a second time, and the Council went into Committee thereon, and the further consideration of the Bill was deferred until next meeting of Council.

12. TOLLS BILL.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill was read a second time, and the Council went into Committee thereon. The Lieutenant-Governor having reported the Bill as amended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next meeting of Council.

13. LOAN BOARD ORDINANCE.—On the motion of the Lieutenant-Governor, seconded by the Auditor-General, the Bill was read a second time, and the Council went into Committee thereon. The Lieutenant-Governor having reported the Bill unamended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

14. FINAL SUPPLEMENTARY SUPPLY BILL.—On the motion of the Auditor-General, seconded by the Queen's Advocate, the Bill was read a second time, and the Council went into Committee thereon. The Auditor-General having reported the Bill as amended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

15. VOLUNTEER BILL.—The report of the Law Officers of the Crown dated 5th December, 1881, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

16. STAMP BILL.—The Queen's Advocate brought up the report of the Sub-Committee on the Bill, which was read by the Clerk of the Council. The Queen's Advocate having reported the Bill with amendments, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

17. BILL PROVIDING FOR THE APPOINTMENT OF INCORPORATED TRUSTEES OF THE CHURCH OF ENGLAND IN CEYLON. BILL AMENDING FIXED CIVIL ESTABLISHMENTS ORDINANCE, NO. 1 OF 1870.—The Lieutenant-Governor brought up the report of the Sub-Committee on these Bills, which was read by the Clerk of the Council. The Queen's Advocate having reported the Bill to amend the Fixed Civil Establishments Ordinance without amendments, and the Bill providing for the appointment of Incorporated Trustees as amended, the reports were adopted, and both the Bills ordered to be referred to the Law Officers of the Crown, the third reading being fixed for next meeting of Council.

18. VOLUNTEER BILL.—The report of the Law Officers of the Crown dated the 5th December, 1881, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was on the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, read a third time and passed.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Wednesday, the 14th instant, at 3 o'clock P.M.

Wednesday, 14th December, 1881.

Dec. 14, 1881

1. The Council met pursuant to adjournment.
2. His Excellency the Governor took the chair.
3. Proceedings of the last meeting read.
4. ASSENT TO BILLS.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinances :-

   Ordinance No. 8 of 1881, intituled "An Ordinance to amend the Ordinance No. 3 of 1861, intituled 'An Ordinance to authorize the formation of a Volunteer Corps in this Colony, and to provide for the good order and discipline thereof.'"

   Ordinance No. 9 of 1881, intituled "An Ordinance further to amend the Ordinance No. 3 of 1861, intituled 'An Ordinance to authorize the formation of a Volunteer Corps in this Colony, and to provide for the good order and discipline thereof.'"

5. PAPERS.—The Lieutenant-Governor laid on the table the following papers :—

   Report of the Committee appointed to secure the representation of Ceylon at the Melbourne International Exhibition, 1881.

   Report on Giant's Tank, Mannár District.

   Return to an Order of the Legislative Council dated 2nd November, 1881: "That a return be furnished showing—

   1. The Number of Agencies and Assistant Agencies.
   2. The salaries attached to each of those Agencies.

3. The batta drawn during the last two years by such Agents and Assistant Agents.
4. The other appointments usually held by such Agents and Assistant Agents simultaneously with their own." (Moved for by the Hon. P. Ráma-Náthan.)

Financial Statements for the Session of 1881.

6. CADASTRAL SURVEY OF CEYLON.—The Hon. P. Ráma-Náthan gave notice of the following motion :—

"To move for a return showing when the Trigonometrical and Cadastral survey of Ceylon were respectively commenced, and what progress has been made since their commencement, specifying in either case the Province and Districts or parts thereof of which such surveys have been made; and to ask whether any systematic efforts are made by the Government to achieve the completion of the surveys."

7. LEAF DISEASE.—The Hon. J. L. Shand gave notice of the following question :—

"To ask what steps have been taken or it is intended to take to offer a reward for the discovery of a cheap efficacious remedy for leaf disease, as promised in the Hon. the Colonial Secretary's letter of 16th March to the Secretary, Planters' Association."

8. MI'RIAGAMA RAILWAY STATION.—The Hon. P. Ráma-Náthan obtained leave of Council to withdraw the following motion of which he had given notice :—

"To call attention to the newly-built Railway Station at Míriagama, and to move that its waiting room be furnished."

9. POST OFFICE SAVINGS BANKS.—The Hon. P. Ráma-Náthan having obtained leave of Council to amend the motion of which he had given notice by inserting the words "that it is desirable" after "move," and "money order" in the place of "Post" before "Offices," moved the following amended motion :—

Referring to the readiness of the Postmaster-General to bring Post Office Savings Banks into operation in the course of next year (as expressed in his report for 1880), that it is desirable that Savings Banks be established in connection with the Money Order Offices now existing in the following places:—

Western Province

Aranáyaka	Já-ela	Negombo
Avisáwélla	Kalutara	Pánadure
Balangoda	Kégalla	Rakwána
Béruwala	Kotté	Ratnapura
Colombo Courts	Kollupitiya	Slave Island
Galkissa	Maradána	Véyangoda
Grandpass	Moratuwa	
Hangwella	Mutwal	

North-Western Province.

Chilaw	Kurunégala	Polgahawela
Kalpitiya	Mádampé	Puttalam

Central Province

Ambagamuwa	Kotmalé	Nuwara Eliya
Badulla	Lunugala	Pussellávа
Ganipola	Madawelatenna	Ramboda
Haldummulla	Maturata	Rattota
Kadugannáwa	Mátalé	
Kandy	Náwalapitiya	

Southern Province.

Baddégama	Dodandúwa	Hikkaduwa
Balapitimódara	Galle	Mátara
Bentota	Hambantota	Tangalla

Eastern Province.

Batticaloa | Trincomalee

North-Central Province.

Anurádhapura

Northern Province.

Vaddukóddai	Kayts	Pallai
Chávakachchéri	Kóppái	Point Pedro
Jaffna	Mannár	Uduvil
Kankésanturai	Mullaittívu	

Seconded by the Hon. A. L. De Alwis.
The Lieutenant-Governor replied.

THE COUNCIL DIVIDED.

Ayes.	*Noes.*
The Hon. J. L. Shand.	The Principal Collector of Customs.
The Hon. A. L. De Alwis.	The Surveyor-General.
The Hon W W. Mitchell.	The Government Agent, Central Province.
The Hon. P. Ráma-Náthan.	The Government Agent, Western Province.
The Hon. J. VanLangenberg.	The Treasurer.
	The Auditor-General.
	The Queen's Advocate
	The Major-General.
	The Lieutenant-Governor.
	His Excellency the Governor.

Ayes 5; Noes 10; Majority 5.—Motion lost.

10. LAW IN RELATION TO CONTRACTS AND THE LAW OF TORTS AND DAMAGES.—The Hon. W. W. Mitchell, pursuant to notice, asked if it is the intention of Government to introduce this Session a measure substituting English Law instead of Roman-Dutch Law in relation to Contracts and the Law of Torts and Damages; and if not, why not; and moved for papers.

Seconded by the Hon. J. VanLangenberg.
The Queen's Advocate replied and laid the papers on the table.

11. GRAVING DOCK.—The Hon. W. W. Mitchell, pursuant to notice, moved that steps be taken to ascertain from Sir John Coode what the cost would be of providing Colombo with a suitable Graving Dock at the Lotus Pond, or at some equally convenient site; also, what would be the cost of a patent slip to accommodate vessels up to 1,500 tons register; and, further, what an hydraulic floating dock would cost to lift ships of the same tonnage.

Seconded by the Surveyor-General.
The Lieutenant-Governor replied.
Motion agreed to.

12. MINING AND MINERAL RIGHTS.—The Hon. J. L. Shand, pursuant to notice, asked what steps Government intend to take to determine the position of proprietors of land in Ceylon with reference to mining and mineral rights; and called for papers.

Seconded by the Hon. W. W. Mitchell.

The Lieutenant-Governor replied, and laid on the table Rules embodying the terms on which the Government is disposed to grant permission to dig for gems or gold.

13. HAPUTALÉ RAILWAY.—The Hon. J. L. Shand, pursuant to notice, moved that, as the debt on the Kandy-Colombo railway will next year be fully liquidated, and in view of the fact that the further extension to Haputalé is essential to ensure the financial success of the Nánu-oya section now under construction, this Council do urge upon the Secretary of State for the Colonies the necessity in the general interests of the Island of immediately sanctioning the commencement of the Haputalé section.

Seconded by the Hon. W. W. Mitchell.
His Excellency the Governor replied.
Motion agreed to.

14. DEFAULTERS, GRAIN TAX ORDINANCE, NO. 11 OF 1878.—The Hon. A. L. De Alwis, pursuant to notice, called attention to the return of defaulters under the Grain Tax Ordinance No. 11 of 1878, laid on the table by the Hon. the Lieutenant-Governor on the 23rd of November last, and moved that, considering the great risks to which the owners of paddy fields are liable of having their fields sold by a possible fraudulent exercise of the discretionary powers vested in the officers appointed by the Government Agents to collect the commutation tax due under the said Ordinance, it is advisable that Government should take such steps as will obviate the possibility of such frauds being committed, or other acts done injurious to the best interests of paddy field owners.

Seconded by the Hon. P. Ráma-Náthan.
The Government Agent, Western Province, replied.
Motion by leave withdrawn.

15. MUNICIPAL COUNCIL AMENDING ORDINANCE.—The Council resumed consideration of the Bill in Committee. The Queen's Advocate reported progress, and the report was adopted, and the further consideration of the Bill in Committee was adjourned.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Thursday, the 15th December, at 2 P.M.

16.—POST OFFICE SAVINGS BANKS.—The Hon. P. Ráma-Náthan recorded the following Protest:—

I BEG to record my reasons for dissenting from the ruling of the majority of this Council.

The Census returns for 1871 enable me to indicate what proportion of the population of Ceylon might be attracted by the advantages usually following the institution of Post Office Savings Banks. Those returns show that the "professional" class averages 1·2 per cent., the commercial

class 5·3 per cent., the "agricultural" class 23·7 per cent., and the "industrial" class 2·8 per cent. of the entire population. The total of the working or productive classes is therefore a little over 30 per cent., or about 750,000 people. Allowing a fair per-centage for those whose earnings are insufficient to meet the daily wants of their families, there would still remain hundreds of thousands of people whose earnings are in excess of such wants. This excess is disposed of in various ways. Some place their moneys at interest, and often lose the little they have saved. Others, afraid of the risks and difficulties connected with investments, lead a life of extravagance, careless of the future. A third class lock up their savings in superfluous jewellery and thus forego the chance of utilizing money to its fullest extent. Others still, and these are by far the largest class, sink their savings in the three great vices of the day—drinking, gambling, and litigation. The growing tastes of the masses of the people for these vices deserve the serious attention of the Government. One cannot now-a-days drive through the streets of any of the leading towns of Ceylon without observing groups of men squatted on the ground playing for money at games of chance. In villages, where the inherited simplicity of the past condemns the new-born vices of the present age, the gambling ring is removed far into the forest under the shade of some lofty tree, where may be seen the first beginnings of many a case of aggravated assault, burglary, cattle-stealing, and even murder. But the more knowing gambler finds a safer livelihood. His insinuating interference with every quarrel, added to his adroit cunning, soon makes him the adviser of the disappointed, the dishonest, and the revengful. Amidst forces so varied originates the much-regretted abuse of the authority of Police Courts and Courts of Justices of the Peace, by the institution of false and frivolous charges and the supporting of them by perjured testimony.

The returns furnished by the Queen's Advocate's Department show that in 1880, a year of great commercial and agricultural depression, there were instituted before these Courts 55,243 cases against 115,517 persons, and that only 20,007 cases were subjected to subsequent procedure against 26,257 persons. It would thus appear that 35,236 cases were needlessly brought against 89,260 persons. The number of people engaged in this dangerous pastime may be easily calculated. Giving the low average of six witnesses (for the prosecution and defence) as interested in each of these needlessly instituted cases, we have, including the complainant and the accused, the enormous number of 315,000 persons wasting their best energies in a thoroughly demoralising pursuit. I take no account here of the "false" suitors and witnesses who frequent the Gansabhawa courts, Courts of Requests, and District Courts. Litigation means payment to "outdoor proctors" and lawyers, purchase of stamps, fees to witnesses, and other charges. Whence is all this money derived, if not from savings or mortgage of one's property? The promotion of thrift amongst these unfortunate people and the other classes whom I have named, by inviting them at their very doors, so to speak, to deposit in the hands of the Government every sixpence or shilling they could spare, is one of the surest methods of weening them from ways that are improvident and mischievous. Their proneness to exaggerate grievances and to be swayed by bad advice, their fancy that one's honour is vindicated by merely dragging his opponent before the court, their want of respect for character, which admits of falsehood and perjury without stint, and which attaches little or no disgrace to penal imprisonment, can be removed only gradually by the spread of education. But the desire for saving, which the facilities offered by postal banks must of necessity create, and that feeling of respectability which results from the possession of means, however small, afford a special guarantee that honest and peaceful modes of life will be persevered in. Moreover, the savings of the present generation would enable the next to purchase freely the benefits of that moral and mental education which, above all others, is the true, though tardy, remedy for social evils.

When I introduced last year (1880) a motion regarding the desirability of establishing postal banks, the chief argument of the Government against the measure was stated as follows by the Hon. the Lieutenant-Governor:—

"The Post Office Department has undertaken the telegraph work within the last few months, and also at the same time had to undertake a very large increase of responsibility in bringing into operation the Money Order system with British India. The money order system at the Post Office has also increased very largely, and we are unwilling to throw upon a willing horse work which I am afraid will break his back. As soon as the Postal-Telegraph Department has had time really to get ahead of the enormous extension of work thrown upon it, it will be time to consider whether the Savings Bank may be added to its already somewhat multifarious duties."

The Postmaster-General, writing in June, 1881, remarked as follows in his Administration Report for 1880:—

"I regret that circumstances have retarded the introduction of a Savings Bank to be worked in connection with this Department. To encourage thrift and afford improved facilities for putting by small sums of money is, I consider, a measure of such great importance that I am most anxious to commence operations at the soonest possible date. I notice each year that the interest which the Sinhalese take in this Department is increasing very rapidly, and I shall be more than ever anxious to push my way still further into the rural districts, especially those of the Western Province, when I know that every little office will be able to offer inducements to the village to lay by ever so small sums of money.

"The speeches, writings, and successful labours of the Imperial Postmaster-General in furtherance of thrift have been brought so prominently before the British public in all parts of the world, that I feel how needless it is for me to write further on this interesting subject. *I hope that in the course of another year the Ceylon Post Office Savings Bank will be in operation.*"

I renewed my motion this Session, indicating 67 of the most prominent Money Order Offices in the several Provinces of the Island as suitable to work the banking business with. The chief

objection of the Government on this occasion was not that the Post Office had too much to do, but that the poorly-salaried postmasters ought not to be exposed to the temptation of keeping even for a day or two the moneys that may be deposited, without some check or other being organized to restrain possible dishonesty on their part. The rules now enforced in England appear to me to leave nothing to be desired in the way of supervision and restraint; but even though Ceylon had not the example and advantage of those rules, the argument urged by the Government proves, I submit, too much; for if moneys at present paid in for purchase of Money Orders are not as a rule misappropriated by Postmasters, there is no ground for assuming that they would misappropriate the moneys paid in as deposits. I do not wish to dwell any longer on this or the minor arguments of the Government, because the establishment of 3,800 postal banks which has been sanctioned in the neighbouring continent of India quite disposes of all the imaginary difficulties of the Ceylon Government, more especially as our Postmaster-General, who has the practical working of the scheme, anticipates no difficulty that cannot be overcome. It seems to me that the Ceylon Government do not fully realize the importance of this measure. If Englishmen in England, who have always prided themselves on self-help, require the several aids to thrift with which the Imperial Government has provided them, are such aids not required in Ceylon more urgently?

I beg therefore respectfully, but most earnestly, to protest against the action of the Ceylon Government in withholding from this country a measure so pregnant with good. It only remains to add that my unofficial colleagues have given me their cordial and unanimous support.

Colombo, 21st December, 1881.

Thursday, 15th December, 1881.

Dec. 15, 1881

1. The Council met pursuant to adjournment.
2. His Excellency the Governor took the chair.
3. Proceedings of the last meeting read.
4. MATTAKKULIYA RAILWAY.—The Hon. J. Van Langenberg, pursuant to notice, and referring to the pledge of Government to construct a line of railway to Mattakkuliya, or to complete the Mádampitiya road, moved that a Commission be appointed to investigate and report how the traffic would best be served, and to submit estimate of cost of construction of a line of railway and estimate of traffic.

   Seconded by the Hon. W. W. Mitchell.
   The Lieutenant-Governor replied.
   Motion agreed to.
5. MUNICIPAL COUNCIL AMENDING BILL.—The Council in Committee resumed consideration of the Bill. The Queen's Advocate having reported the Bill with amendments, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.
6. TOLLS BILL.—The Report of the Law Officers of the Crown, dated the 10th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Auditor-General, read a third time and passed.
7. LOAN BOARD ORDINANCE.—The report of the Law Officers of the Crown, dated 10th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Auditor-General, read a third time and passed.
8. FINAL SUPPLEMENTARY SUPPLY BILL, 1880.—The report of the Law Officers of the Crown, dated 10th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Auditor-General, seconded by the Lieutenant-Governor, read a third time and passed.
9. STAMP ORDINANCE.—The report of the Law Officers of the Crown dated 10th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Queen's Advocate, seconded by the Lieutenant-Governor, read a third time and passed.
10. BILL AMENDING ORDINANCE NO. 1 OF 1870 RELATING TO THE FIXED CIVIL ESTABLISHMENTS OF THE COLONY.—The report of the Law Officers of the Crown, dated the 10th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

LEGISLATIVE COUNCIL.

Proceedings.

Dec. 15, 1881.

11. BILL PROVIDING FOR THE APPOINTMENT OF INCORPORATED TRUSTEES OF THE CHURCH OF ENGLAND IN CEYLON.—The report of the Law Officers of the Crown, dated the 10th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

12. SUPPLEMENTARY SUPPLY BILL, 1881.—The Lieutenant-Governor brought up the report of the Sub-Committee on the Bill, which was read by the Clerk of the Council, and the Bill was considered in Committee. The Lieutenant-Governor having reported the Bill as amended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

13. BILL AMENDING THE MEDICAL WANTS ORDINANCE, 1880.—The Lieutenant-Governor brought up the report of the Sub-Committee on the Bill, which was read by the Clerk of the Council, and the Bill was considered in Committee. The Lieutenant-Governor having reported the Bill as amended, the report was adopted, and the Bill ordered to be referred to the Law Officers of the Crown, the third reading being fixed for the next meeting of Council.

On the motion of the Lieutenant-Governor, the Council at its rising adjourned till Wednesday, the 21st December, at 3 o'clock P.M.

Wednesday, 21st December, 1881.

Dec. 21, 1881.

1. The Council met pursuant to adjournment.
2. His Excellency the Governor took the chair.
3. Proceedings of the last meeting read.
4. ASSENT TO BILLS.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinances :—

   No. 10 of 1881, intituled "An Ordinance to establish further Tolls and to discontinue certain Tolls."

   No. 11 of 1881, intituled "An Ordinance to amend the Ordinance No. 4 of 1879, intituled 'An Ordinance to provide for the further appropriation of certain unclaimed balances from the funds of the Loan Board.'"

   No. 12 of 1881, intituled "An Ordinance for making final provision for the Supplementary Contingent Charges for the year 1880."

   No. 13 of 1881, intituled "An Ordinance to amend the Ordinance No. 8 of 1863 and the Ordinance No. 3 of 1865."

   No. 14 of 1881, intituled "An Ordinance to amend the Ordinance No. 1 of 1870, intituled 'An Ordinance relating to the Fixed Civil Establishments of this Colony.'"

   No. 15 of 1881, intituled "An Ordinance for the appointment of Incorporated Trustees of the Church of England in Ceylon."

5. PAPERS.—The Lieutenant-Governor laid on the table the following papers :—

   Returns of the Irrigation Works executed in the several Provinces of the Island from 1868 to 30th June, 1881.

   Further Correspondence on the subject of Ecclesiastical matters in Ceylon.

   Administration Reports (1880), Part IV., Miscellaneous :—
   Report on the Government Printing Office.

   Lists of Labour rendered and works executed in the several Provinces of the Island during the year 1880, under Ordinance No. 10 of 1861.

6. PETITION.—The Hon. A. L. De Alwis presented a petition from the inhabitants of Galle, complaining of certain judicial proceedings of the Police Magistrate of Galle.
7. COFFEE LEAF DISEASE.—The Hon. J. L. Shand, pursuant to notice, asked what steps have been taken, or it is intended to take, to offer a reward for the discovery of a cheap efficacious remedy for leaf-disease, as promised in the Hon. the Colonial Secretary's letter of 16th March to the Secretary, Planters' Association.

   The Lieutenant-Governor replied.

8. TRIGONOMETRICAL AND CADASTRAL SURVEY OF CEYLON.—The Hon. P. Ráma-Náthan, pursuant to notice, moved for a return showing when the Trigonometrical and Cadastral survey of Ceylon were respectively commenced, and what progress has been made since their commencement, specifying in either case the Province and Districts or parts thereof, of which such surveys have been made, and asked whether any systematic efforts are made by the Government to achieve the completion of the surveys.

   Seconded by the Hon. A. L. De Alwis.
   The Lieutenant-Governor replied, and laid the return on the table.

9. CHANNEL LEADING TO THE PORT OF KAYTS.—The Hon. P. Ráma-Náthan, pursuant to notice, asked whether the cost of surveying the channel leading to the port of Kayts had been estimated, as promised; and if so, whether the Government would order the survey to be made, so that the cost of the dredging of the channel may be calculated; and moved for papers.

Seconded by the Hon. W. W. Mitchell.
The Lieutenant-Governor replied.

10. MUNICIPAL COUNCILS BILL.—The report of the Law Officers of the Crown dated 20th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Queen's Advocate, seconded by the Government Agent, Western Province, read a third time and passed.

11. SUPPLEMENTARY SUPPLY BILL, 1881.—The report of the Law Officers of the Crown dated the 20th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Auditor-General, read a third time and passed.

12. MEDICAL WANTS BILL.—The report of the Law Officers of the Crown dated the 20th December, stating that there was in their opinion no legal impediment to the execution by the Colonial Tribunals of a law in terms of the Bill, having been read, the Bill was, on the motion of the Lieutenant-Governor, seconded by the Queen's Advocate, read a third time and passed.

13. ASSENT TO BILLS.—The Lieutenant-Governor announced to the Council that His Excellency the Governor had given his assent to the following Ordinances:—

No. 16 of 1881, intituled "An Ordinance to amend 'The Municipal Councils Ordinance, 1865,' and for other purposes."

No. 17 of 1881, intituled "An Ordinance for making provision for the Supplementary Contingent Charges for the year 1881."

No. 18 of 1881, intituled "An Ordinance to amend the Medical Wants Ordinance, 1880."

14. CLOSING OF SESSION.—His Excellency the Governor closed the Session with the following Address:—

HONOURABLE GENTLEMEN OF THE LEGISLATIVE COUNCIL,

THE accustomed time of closing the Session has arrived, but before we separate for the recess I desire to thank you for the supplies which you have voted for carrying on the Government.

2. The sums which you have appropriated for Public Works are necessarily much less than they were in the late more prosperous years, and I especially lament the enforced reduction in the vote for Irrigation Works; but in presence of the large works now being carried on with borrowed money, my Government has felt the paramount necessity of so reducing the ordinary expenditure as to keep it within the limits of the revenue which can be certainly depended upon, and thus maintaining during the present critical period the sound financial position which has for so long characterized the Ceylon Government.

3. The vote of the Council to complete the South arm of the Breakwater on the plan presented by Sir John Coode has settled one of the open questions connected with the Harbour Works, and the experience and information which will be acquired during the recess will enable the Council to come to a determination in regard to the question that still remains undecided. The successful result which has thus far been achieved not only justifies the outlay, great as it is, but gives a fair prospect that all the advantages anticipated when the works were commenced will be gradually realized. Within the last two months we have seen ships of the largest size at anchor within the harbour, and the intended early removal of the great English and French Companies to Colombo will, without doubt, increase largely its trade, which will be still further extended if it be found practicable to provide accommodation for the docking and refitting of vessels.

4. The measure that you have passed for the prospective withdrawal of the aid heretofore given to certain Christian Communities from the Public Treasury has long been advocated in Ceylon, both in this Council and in the community. The terms on which you have sanctioned disendowment are so liberal that I am persuaded the Churches will not suffer when the aid is withdrawn; but will, as self-governing, self-supporting Churches, pursue that noble career of unselfish usefulness, and of zeal for the welfare of the European and Native population alike, which has always marked the history of the Christian Churches in Ceylon.

5. It is a matter for regret that it should have been deemed necessary to continue in force the Coffee Stealing Ordinance. Exceptional legislation is always to be deprecated, but the peculiar facilities which unavoidably exist and will always exist for stealing coffee from the widely-scattered plantations, and for removing and disposing of it, make it necessary to place the trade in green coffee under restrictions which do not injure any *honest* traders, but which have already proved moderately successful in preventing illicit dealing in stolen coffee.

6. I was not unprepared to find that the Ordinance which, in pursuance of the instructions of the Secretary of State for the Colonies, I laid before you, for raising the funds necessary to pay for the medical relief of immigrant labourers, would not be acceptable to the employers of that labour;

and the protests that have been made against the law will be laid in due course before Her Majesty's Government. While it is the duty of the Government to see that the medical care required by law shall be provided for the coolies, it has not less been my earnest desire to meet the wishes of the Planting Community both in the means of providing for that medical care, and in the mode of raising the funds to pay for it. And I shall at any time most willingly lay before the Secretary of State for his consideration any amendment of the Ordinance which may be proposed on behalf of the Planting Community for changing the method, but not the incidence of the tax; for the only object aimed at by the Government is the well-being of the coolies who are introduced annually with the consent of the Government, and who are therefore in a special manner entitled to the protection of the Government.

7. I shall not fail to bring under the especial notice of the Secretary of State the objections so reasonably entertained to conferring upon certain French mail steamers immunities which are by the comity of nations granted to vessels of war, but to vessels of war only.

8. The Bills that you have passed for improving the laws relating to the Volunteers will enable that excellent Force to be placed under the same general regulations as the Volunteer Forces in England, and will thereby contribute to the permanence of a movement, the success of which has passed all expectation.

9. It is with much reluctance that I have been obliged to postpone to another Session the introduction into the Council of the great measures of Law Reform that have been for some time under the consideration of the Government. Bills have been prepared for the revision of our Criminal Law, for the settlement of Criminal Procedure, and for determining Civil Procedure; and I can only now express my hope that these great measures and some equally pressing amendments of our Laws may be so matured during the recess as to allow of their being introduced and passed in the next Session of Council.

10. I now prorogue the Council, and trust that, under the Divine Blessing, the coming year may prove to be one of plenteousness among the native population and of prosperity for the whole Colony.

I.—1881.

IRRIGATION IN THE MANNAR DISTRICT.

REPORTS

UPON THE

AKATTI MURIPPU TANK AND MODARAGAM-OYA WORKS.

By Mr. HENRY PARKER,
IRRIGATION OFFICER

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

IRRIGATION IN THE MANNAR DISTRICT.

I.—AKATTI MURIPPU TANK.

THE Akatti Murippu tank, extending into the two Músáli-pattus of the Mannár District, is situated on the south side of the minor road from Alankulam to Sillávatturai, and is two or three miles from the latter place. The minor road runs along the side of the existing bund for rather more than two miles.

2. This tank forms a part of the general plan for the irrigation of the whole littoral plain and, like the other reservoirs, it is in an unfinished state. Were the work considered as a distinct scheme, forming no portion of a larger project, its partial construction and subsequent abandonment would seem to be a singular instance of an unwise misapplication of labour. Unconnected by any channel with a supply of water sufficient to fill it, possessing a drainage area probably but slightly greater in extent than the tank itself, and situated on a wide plain having a rise of only three or four feet per mile, there is here the undeveloped design of a reservoir entitled to be ranked, as regards its size, immediately after the largest ones in the Island.

3. When, however, it is viewed as an integral part of a more extensive scheme, it appears in a different character. It is then seen to be undoubtedly the incomplete complementary reservoir of the Aruvi-áru irrigation works, and almost the duplicate of the twin tank on the opposite bank of that river, the well-known *Kaṭṭu-karai* or "Giant's tank." Its distance from the anicut which was intended to divert the river water for irrigation purposes is a little more than that of the Giant's tank, but the level of its bed being nine feet lower than the bed of the other, its water-supply may with ease be obtained from the same head-works.

4. There are no natural obstacles to its completion. The opinion has been erroneously expressed, that the abandonment of the Giant's tank and its connected work was due either to the discovery that the tank was at too high a level, or to the excessive amount of cutting met with in the channel from the river; but no such causes can be alleged for the stoppage of the Akatti Murippu works, where the fall from the anicut is ample, and the channel for carrying the water has not even been begun, so far as I have ascertained: nor can any trouble have been experienced in the construction of the tank itself. It would be impossible to find a bund the formation of which presented less difficulty; as in the rest of the plain, the soil on the whole site is good clay, many feet in depth, and nothing could be simpler than its disposition in the usual Sinhalese manner along the selected line.

5. The disastrous effect of the great flood which partially destroyed the Aruvi-áru head-works will also not explain the abandonment of the Akatti Murippu scheme; the anicut, the only part of the head-works that would be made use of for this tank, having been repaired, and being even now in fairly good order. The same flood can also have done but little damage to this embankment. That it burst the bund, there is evidence, I believe, in the present name of the tank "Akatti (tree) breach tank;" in fact, it cannot have failed to wash away some of the bund, but the height is only five feet and the injury must have been very trifling.

6. The reasons for leaving the work in its present very incomplete state must evidently be sought for elsewhere. In my introductory report I have already stated my supposition that the whole project for the irrigation of the district is due to the energy of Parâkkrama Bâhu the Great, and that after his death it was not proceeded with; and further considerations strengthen the opinion. The tradition of the neighbourhood attributes the scheme to a Sinhalese king, and as the Tamils have held unbroken possession of all the districts from the time of Mâgha, it is unlikely that an error would arise as to the nationality of the monarch. In any case, no Tamil rulers undertook such extensive works. During the reign of Mâgha some tanks appear to have been repaired in the North-Western Province; but the work was of a character totally different from this, and consisted only of the filling of breaches, and the construction of sluices and spill-waters. Had these works been begun by a Tamil king, too, no motive could be found for their non-completion by his successors. For these reasons the date of their construction must be removed to some period prior to the last Tamil invasion.

7. In my first report I remarked that the hearting of rubble in concrete indicates that the building of the anicuts was carried on at a not very early period, and I also stated that the comprehensive nature of the whole design seems to point to its conception at a time not anterior to the tenth century. I think this date may be considerably extended, for it was not until the reign of Parâkrama Bâhu that the extensive channels similar to those here required were made.

IRRIGATION

MANNAR DISTRICT.

Report.

8. To a student of the history of Ceylon engineering the accurate fixing of the date of these constructions is of considerable importance; for, of all the tanks and other irrigation works in the Island, this is probably the only scheme in which an opportunity is afforded of learning the actual mode of building. Akatti Murippu tank is of peculiar interest from this cause. It is here seen that the formation of the embankment was begun before the channel for supplying the tank with water was opened, a fact which of course quite proves the error of the supposition occasionally expressed, that the levelling of the Sinhalese engineers was accomplished by means of water turned down the channels as their excavation proceeded. The soil composing the bund appears to have been deposited in layers, horizontal at first, but gradually rising in the middle as the height of the bund increased. The raising of the part opposite the deeper portion of the tank was first taken in hand, nothing having been done at the upper ends, where the continuation of the bund would be needed for a mile or two beyond its present termination. The construction of the sluices was not commenced.

9. The description of the general principle on which all these reservoirs were designed, contained in paragraph 37 of my introductory report on these works, is closely applicable to this special instance. The site chosen was the upper part of the plain; when raised to its full height, the embankment will extend to the foot of the higher forest tract. The two arms of the bund stretching towards the high ground appear to be quite parallel at their upper ends; but as the ridge at this spot runs obliquely away from the coast line, while these portions of the bund run nearly at right angles to the coast line, their lengths vary greatly, the northern arm being two or two and-a-half miles long, and the southern arm about three-quarters of a mile long. The lower parts of these arms curve slightly inward, and the curves turn sharply in from their lower ends, and are then produced until a junction is effected, the length of this flat curve connecting the arms being about a mile and-a-half.

10. The total length of the present bund is therefore probably four and-a-half miles. Its width varies considerably—in some parts being 150 feet, in others not more than 50 feet, while in places where it has been breached, and since repaired, it is of even less width. Where it is in good order the average is about one hundred feet. Its height is very insignificant: along the side of the minor road it is only three feet, and along the deeper part of the tank five feet.

11. There is no trace of either sluices or spill-waters. It was useless to build the latter before the bund was capable of holding up water that would extend to them, and the construction of the former was obviously deferred until the earthwork had made more progress.

12. Judging by the breadth of base given to the bund, the comparative levels of the anicut and tank, and the probable length of a channel to connect them, it may be estimated that the depth of water intended to be impounded was from fifteen to eighteen feet. When full, the tank would then cover 2,500 or 3,000 acres, and the total length of its bund would be some seven or eight miles enclosing it on three sides.

13. A considerable area in the bed of this reservoir is now occupied by tanks and fields. There appear to be six village tanks and one "Tâvadhyûr" in it—(the villagers say there are seven village tanks and four "Tâvadhyûrs), and the whole extent thus utilized is about 900 acres, as shewn in schedule No. 1 attached to this report. These tanks are all of the usual style of the district, possessing weak, straggling bunds four or five feet high, enclosing extensive acres, but retaining little water. If the Akatti Murippu tank be placed in order, it is said that the people will have no objection to accept lands below it in exchange for their present holdings in its bed, provided compensation be paid for their houses and gardens, the latter of which are of very small value. Those villagers to whom I have spoken on the subject shewed no special desire to retain their existing tanks and fields, and expressed their readiness to move to other land below the bund if ordered to do so.

14. About six miles away, in the forest tract, is a large "villu" called Mâvillu, from which an outlet channel has been partly cut to the tank. The plan of this natural pool, which is on the boundary between the Northern and North-Central Provinces, is a regular oval, pointing towards the tank; and approximately its length is fifty chains and its width thirty chains, its open area being from eighty to one hundred acres.

15. A small sandy stream, which is said to partly encircle the "villu" to the eastward, joins it on the south side; its width is from twelve to fifteen feet, and its depth varies from two to three feet. The people who live in the neighbourhood of the Akatti Murippu tank state that this is part of a channel which was cut from the Aruvi-âru to the tank, water first flowing into Mâvillu, and leaving it again by the excavated outlet-channel above-mentioned. This assertion is, however, quite untrustworthy, and the stream is, most probably, the natural course of the drainage of the adjoining ground. No sign of such a channel could be found nearer the anicut, nor could the people say in what direction it runs; and the villu is apparently at too great a height to permit water to be turned into it from the anicut.

16. The outlet channel, in which there is no trace of a sluice, leaves the "villu" near the point of the oval—the end nearest to the Akatti Murippu tank. Its level there is much the same as that of the inlet stream, being six or seven feet above the lower

portion of the bed of the "villu;" it varies from fifteen to twenty feet in width, and is three feet deep. It is said that a mile of this channel has been cut; but the jungle was too dense, when I visited it with Mr. Haughton, to permit an examination into the truth of this statement. Water now flows down it into the "villu," and, in order to make use of the latter as a feeder of the Akatti Murippu tank, it would be necessary to lower the bed of the channel where it crosses the dividing ridge, by some ten or fifteen feet, leaving six or seven feet of water in the "villu."

17. Although local wisdom is of a contrary opinion, it appears to me that such a work would prove of no benefit when done. In dry seasons the "villu" will be useful as a buffalo tank, and as an admirable place for the illicit slaughter of deer; but, as a storage reservoir for the Akatti Murippu tank, it cannot be of any value.

18. To render the Akatti Murippu tank of use, it is necessary to complete the original design, though the retention of a less head of water than was apparently originally contemplated may be found to suffice. This will depend on two things: the extent of land to be irrigated, and the evaporation and absorption during the months in which cultivation is carried on; and on neither points has accurate information yet been obtained.

19. The total extent of irrigable land may be 7,000 acres or more. It would of course be unnecessary to store water for the whole of this at first, and a supply enough for little more than half that area would be sufficient for some years. Were more afterwards required, it would be a simple matter to raise the height of the bund and sluices.

20. For this acreage a head of ten or eleven feet of water would be enough, at which level the length of the bund might be about 6½ miles, and the area of the tank 2,000 acres. Allowing the bund a top width of six feet, and side slopes of 2½ and 2 to 1, the crown being four feet above spill-level, the cost of the works at the tank itself, including contingencies and non-effective charges, might be 100,000 rupees.

21. For a water-supply that could be depended upon, it would be necessary to turn to the Aruvi-âru, and a channel would be wanted from the existing anicut on that river. This anicut would previously have been thoroughly repaired in connection with the Giant's tank works, and no expenditure on it would be needed in order to obtain water for the Akatti Murippu tank. The work required would therefore be the excavation of a channel from the anicut, with a head-sluice for regulating the volume of water flowing to the tank. I believe the length of this channel would be fifteen miles, and its cost, including the sluice and adequate escapes for floods, would probably be 100,000 rupees.

22. The total cost of the works would thus be 200,000 rupees.* I have levelled down from the anicut to the tank, and along the present low bund of the latter, but of course only an actual trace and sections over the line of the channel will shew its exact length, and amount of cutting required; and it is rather uncertain how far the bund will extend when raised.

23. The amount of the probable revenue immediately derivable from the works admits of a nearer approximation. This will be received from the fields both under the tank and under the channel. Under the tank there are, according to schedule No. 2, fifteen Tâvadiyûr fields and seventeen village tank fields, and under the channel the numbers are respectively seven and two. It is not certain that all of these fields under the channel can be irrigated, but it is presumed that such will be the case.

24. The area of the present fields inside the tank is 564 acres, and the average crop obtained per annum is stated in schedule No. 1 to be 2,155 bushels. At 1 rupee and 50 cents per bushel the actual rate of the district, the annual tythe lost when the tank is filled will thus be 323 rupees. But previous to the repair of the Akatti Murippu tank the neighbouring Giant's tank will have been placed in working order, and a large increase in the production of paddy will have taken place. Without any doubt this will greatly affect the local value of the grain, and the price will already have sunk as low as it will be likely to go, probably to half the present rate. Calculating, therefore, the loss of tythe at 75 cents a bushel, the amount will be 161 rupees.

25. The extent of the fields under the tank and channel is shewn in schedule No. 2 to be 2,380 acres, and their average yearly crop is 6,145 bushels, one-tenth of which, at the above rate, will give a tythe of 460 rupees per annum received from the irrigable lands before the execution of the works.

26. The Adikars and cultivators agree in stating that with a sufficient supply of water the whole extent of their fields would be cultivated in the North-East monsoon, and half that area in the South-West monsoon; the land being of course manured regularly. Considering the natural richness of the soil, and the low price that will be obtained for the crops (rendering it necessary to cultivate more than double the present acreage in order to obtain the same financial results), I have little doubt that such would be the case. At a low rate there would never fail to be a good market for the produce, and Moormen, who are almost the sole inhabitants of this part of the district, are always industrious when their own aggrandisement is in view, and have a morbid *penchant* for amassing wealth.

* The cost of the work on the bund might be a little more, and the cost of the work in the channel a little less, than the above amounts; but that would not affect the whole estimate, and probably the total amount will be nearly as stated.

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27. The average crop, when enough water is available, is said to be thirty bushels an acre over the plain, and in good lands double that quantity is often reaped. The two crops would thus yield 45 bushels per acre over the whole area of fields. The land here is, I believe, not quite so fertile as some on the opposite bank of the river, and it will be safe to estimate the crop at 40 bushels, one-tenth of which, at 75 cents a bushel, will yield a return of 3 rupees per acre ; or 4 rupees per acre, including the ordinary water-rate 1 rupee.

28. The annual return to be expected from the existing fields and the lands to be given in exchange for submerged fields is, therefore, as follows :—

			Rs	cts.
Tythe on 2,944 acres at Rs. 3	...	...	8,832	0
Water-rate on 2,944 acres at Rs. 1	...	...	2,944	0
Gross return ...		Rs.	11,776	0
Deduct loss on submerged lands, Rs. 161	0			
Tythe from other lands ...	460	0		
			621	0
Net return due to works ...		Rs.	11,155	0

or, say, 11,000 rupees—a return equal to 5½ per cent. on the estimated expenditure.

29. It would be absurd to suppose that no further extension of paddy cultivation will take place here after a sufficient water-supply has been provided, and I think the Government Agent and Assistant Government Agent will agree with me that when the means of regular cultivation are available, all the suitable lands will eventually be asweddumized.

30. Even for the present lands such a supply is very urgently needed. With an area of 2,168 acres of fields below the tank, as shewn on schedule No. 2, the average extent now sown in the North-East monsoon is 300 acres, in the South-West monsoon only 22 acres one-tenth of what might be sown Such facts speak for themselves.

31. Under existing circumstances the people are unable to take full advantage of a good season even when it does occur, having neither enough seed paddy nor enough cattle for ploughing. During my stay in the district I have unfortunately had good opportunities of seeing the effect of a long protracted drought, and it is really deplorable. The whole jungle, more especially near the Akatti Murippu tank, was quite offensive at times through the effluvia from the dead buffaloes which have been carried off by disease this last summer. Whether the disease was solely caused by the drought, I am unable to say, but there can be no doubt that in any case its disastrous effect was greatly increased by the previous emaciation of the animals, which of course was entirely due to the drought. Many men have lost all the cattle they possessed One man told me that he had lost five buffaloes, and is now a poor man and without the means of having more; and that is the case with numbers of the cultivators. Even last month (November) I was informed that at some villages the buffaloes now alive and healthy were so weak that ploughing could be done only on alternate days. The people are not often in actual want, I should imagine, for the North-East monsoon is very rarely an entire failure, but they are in a chronic state of poverty just removed from actual want. By the time they are beginning to recover from the effect of one drought a second occurs, and they relapse into the same miserable condition as before.

32. The only remedy for this state of things is the provision of adequate means of irrigation ; and it seems to me that even were the above cultivated rate of interest all that could be looked for, from the placing in order of the Akatti Murippu tank, the undoubted benefits which the work would confer on the cultivators would amply justify the estimated expenditure.

33. Another object would also be effectually served by the restoration of this work. The introduction of a strong Tamil element into the district under the tank would tend to restrain the vindictiveness of the Moormen who inhabit it. For years they have been considered the most troublesome people in the province; they appear to relieve the tedium of their many spare moments by a wholesale killing of the deer of the neighbourhood in the close season, and by the occasional murder of an inoffending stranger. With an abundant supply of water once secured, cultivation would be carried on almost incessantly, and their energies would be diverted into a less objectionable channel.

34. I beg respectfully to suggest, therefore, that after the plans and drawings for the restoration of the Giant's Tank and its connected works have been finished, the preparation of the necessary drawings and estimate for the completion of the Akatti Murippu works may be permitted.

HENRY PARKER,
Irrigation Officer.

Giant's Tank, 10th December, 1880.

SCHEDULE No 1.

TANKS and FIELDS inside the Akatti Murippu Tank.

Name of Tank.	Number of inhabitants in 1874.	Tank, approximate area, in acres.	Field.		North-East Monsoon.		South-West Monsoon.	
			Total area, in acres.	Area of existing field, in acres.	Average area sown, in acres.	Average crop reaped, in bushels.	Average area sown, in acres.	Average crop reaped, in bushels.
VILLAGE TANKS.								
Musali North.								
Periyapillachchipótkani	163	90	153 3-9ths	153 3-9ths	33 7-9ths	776	2 6-9ths	22½
Sinnapillachchipótkani	26	70	64 8-9ths	54 4-9ths	19 5-9ths	489	1 1-9th	12½
Karunkalitálvu	13	20	64	44 4-9ths	8 8-9ths	115	Nil	Nil
Ittikulam	48	50	81 7-9ths	44 4-9ths	9 3-9ths	140	Nil	Nil
Veppankulam	129	70	184	139 5-9ths	30 8-9ths	409	3 3-9ths	22½
Karunkalimottie	6	10	5 1-9th	5 1-9th	2 6-9ths	48	11 3-9ths	105
Pichcheipáni Nedunkulam*	—	—	—	—	—	—	—	—
Távadiyurs.								
Perunkattusirukulam	Nil	20	11 1-9th	4 4-9ths	5 5-9ths	85½	Nil	Nil
Pallalankulam*	—	—	—	—	—	—	—	—
Nedunkulam*	—	—	—	—		—	—	—
Putukulam*	—	—	—	—	—	—	—	—
Veppankulattaputukulam	—	—	—	—	—	—	—	—
Total	385	330	564 2-9ths	445 7-9ths	109 6-9ths	2062½	18 4-9ths	162½

* According to the villagers, these are also in the bed of the tank.

Note.—All areas are calculated at the rate of 2¼ bushels of sowing extent to an acre.

SCHEDULE No 2.

LANDS irrigable by the Akatti Murippu Tank and its Channel.

Name of village tank.	Number of inhabitants in 1874.	Tank, approximate area, in acres.	Field.		North-East Monsoon.		South-West Monsoon.	
			Total area, in acres	Area of existing fields, in acres.	Average area sown, in acres	Average crop reaped, in bushels.	Average area sown, in acres	Average crop reaped, in bushels.
I.—LANDS UNDER THE TANK.								
Musali North.								
Marakayarkulam	47	70	190 4-9ths	88 8-9ths	21 7-9ths	387	5-9ths	6¼
Mettanvali	56	80	145 7-9ths	80	22 6-9ths	411	1 7-9ths	20
Pandaravali	56	90	75 1-9th	71 1-9th	23 1-9th	457	1 1 9th	16¼
Manalkulam	26	35	78 6-9ths	44 4-9ths	14 6-9ths	204	8-9ths	8¾
Alavakkasirukulam	21	20	23 7-9ths	17 7-9ths	6 6-9ths	90	Nil	Nil
Varavali	48	35	103 5-9ths	57 7 9ths	16	313	1 5-9ths	12½
Puliyadiniravukulam	3	15	5 3-9ths	3 3-9ths	8-9ths	16	2-9ths	2½
Ilantiekulam	80	45	88 4-9ths	44 4-9ths	8 8-9ths	140	Nil	Nil
Antonimelinchikulam	70	20	41 3-9ths	35 5-9ths	5 3-9ths	126	8-9ths	10
Musali South.								
Kondachchi	100	90	95 1-9th	26 6-9ths	17 7-9ths	300	3 7-9ths	70
Kokkupudayan	38	90	83 3-9ths	22 2-9ths	26 6-9ths	297	4-9ths	2½
Ilakkarikulam	24	90	78 7-9ths	22 2-9ths	9 3-9ths	147	2-9ths	1¼
Iampatta Mudaliyarkattu	107	90	181 1-9th	35 5-9ths	22 6-9ths	409	2 4-9ths	36¼
Kulamkulam	60	80	131 3-9ths	44 4-9ths	16	317	Nil	Nil
Putuvali	115	80	146 6-9ths	44 4-9ths	30 8-9ths	728	3 3-9ths	75
Musalikulam	40	45	104	88 8-9ths	21 3-9ths	449	2 7-9ths	50
Periyanochchikulam	17	35	87 5-9ths	11 1-9th	13 3-9ths	330	Nil	Nil
Total	907	1010	1659 7-9ths	738 8-9ths	278	5121	20	311¼
II.—LANDS UNDER THE CHANNEL								
Nándttán East.	25	90	85 7-9ths	67	—	—	—	—
Pannaivettuvan	—	40	22 2-9ths	9	—	—	—	—
Saibupuliyankulam								
Total	—	130	108	76	Total crop for the year, 356 bushels.			

* At the same rate as in the lands under the tank.

Note.—All areas are calculated at the rate of 2¼ bushels of sowing extent.

SCHEDULE No. 2—*continued.*

Lands irrigable by the Akatti Murippu Tank and its Channel.

Name of Tavadiyúr tank.	Tank, approximate area, in acres	Field. Total area, in acres	Field. Area of existing fields, in acres	North-East Monsoon. Average area sown, in acres.	North-East Monsoon. Acreage crop reaped, in bushels.	South-West Monsoon. Average area sown, in acres.	South-West Monsoon. Average crop reaped, in bushels.
I.—Lands under the Tank.							
Musali North.							
Vappákulam	30	104	60	7 7-9ths	66½	Nil	Nil
Pairikkapattankulam	30	60 4-9ths	51 1-9th	4	49	1 1-9th	6¼
Mutali-villu ...	30	44 4-9ths	44 4-9ths	4-9ths	5	Nil	Nil
Nochchipûkulam	20	60 4-9ths	13 3-9ths	5 3-9ths	71½	do.	do.
Sádiyappankulam	50	40 8-9ths	33 8-9ths	4-9ths	5½	do.	do.
Sankuvankulam	20	20	Nil	Nil	Nil	do.	do.
Tellavadialavakka	15	11 1-9th	1-9th	1-9th	1	do.	do.
Musali South.							
Tandikulam	70	57 3-9ths	11 1 9th	2-9ths	6	Nil	Nil
Sempankundu	15	9 3-9ths	2 2-9ths	Nil	Nil	do.	do.
Pulliyamottiekulam	20	22 2-9ths	4 4-9ths	3 5-9ths	52	do.	do.
Palsottikandal	20	37 7-9ths	4 4-9ths	Nil	Nil	do.	do
Mutalivellu	10	3 5-9ths	4-9ths	Nil	do.	do.	do.
Ahamadu Nainakulam	5	3 1-9th	8-9ths	1 1-9th	22	1 1-9th	10
Púleiyadiserukulam	20	11 1-9th	4 4-9ths	1-9th	1	Nil	Nil
Sippanochchikulam	10	22 2-9ths	Nil	Nil	Nil.	do.	do.
Totals ..	365	508	230 3-9ths	28 1-9th	279½	2 2-9ths	16¼
II.—Lands under the Channel.							
Nanattan East.							
Ilevikarambakulam	20	7 5 9ths	3 3-9ths	—	—	—	—
Vattiyarperiyakattu .	20	6 6-9ths	3 3-9ths	—	—	—	—
Avenenykarottan (*sic*)	20	7 1-9th	Nil	—	—	—	—
Valliyadikulam	20	5 5-9ths	Nil	—	—	—	—
Paliyadikulam ...	15	13 3-9ths	4 4-9ths	—	—	—	—
Kalliyadeykal .. .	20	20	4 4-9ths	—	—	—	—
Kottikulam	70	44 4-9ths	13 3-9ths	—	—	—	—
Total ..	185	104 6-9ths	28 8-9ths	Total for the year, 61 bushels.*			

Note.—All areas are computed at the rate of 2¼ bushels of sowing extent to an acre.

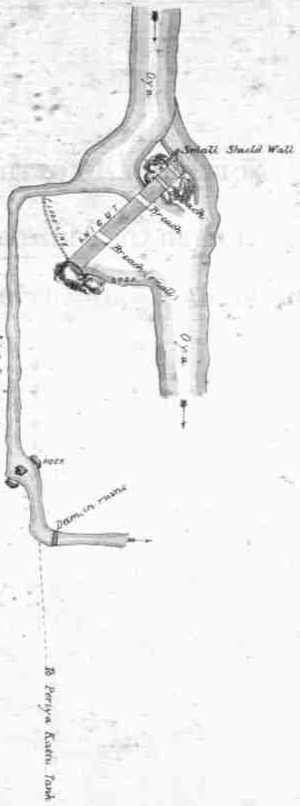
* At the same rate as in the lands under the tank.

Northern Province.

Irrigation in the Mannar District

The Modaragama-Oya Works.

Rough Sketch of the Head Works.



II.—THE MODARAGAMA-OYA WORKS.

IRRIGATION

MANNAR DISTRICT

Report.

THE site of the Mödaragama-oya irrigation works is the extreme north-western corner of the North-Central Province—the boundary of that province running along the outer foot of the bund of the Periyakattu tank. This spot is just on the margin of the unexplored tract of dense forest stretching far into the Northern Province from the Puttalam-Anuradhapura road, west of the Kala-oya bridge—a tract that, once well populated at every suitable point where a supply of water was, or could be made available, is now perhaps as little known, in its southern portion, as any ground in Ceylon. Like the head-works at the other rivers the anicut is quite in the forest.

2. The works were intended to utilize the water of the Mödaragama-oya. This stream, known in the upper part of its course as the Talâwa-ela, takes its origin, I believe, at the spill-water of the Talâwa village tank, which is on the south side of the Pâdeniya-Anuradhapura road, at the 8th mile from the latter place. From the above tank it runs in a north-westerly direction, crossing the road to Puttalam at about the sixth mile from Anuradhapura, and finally reaches the sea at Marisikattu, the total distance from its rise to its mouth being nearly forty miles in a direct line. In the last three or four miles of its course it forms the boundary between the Northern and North-Western Provinces.

3. As the oya thus flows from the immediate neighbourhood of Anuradhapura, the rainfall of that place may be considered to present a trustworthy index to the times when floods, or, at the least, a flow sufficient for irrigation purposes, may be expected.

4. The following table exhibits the Anuradhapura mean rainfall for the last ten years, according to a return furnished by the Hon. the Surveyor-General :—

	Inches.		Inches.		Inches.
January ...	3·01	May ...	3·27	September ...	3·08
February .	1·28	June	1·10	October	6·45*
March ...	3·54	July ...	1·02	November .	11·70
April ...	7·71	August ...	2·42	December ...	7·48

5. My observations on the Aruvi-aru and local information collected respecting it tend to shew that when the ground is not already saturated with moisture a rainfall at Anuradhapura of less than six inches a month causes no flow in that part of the river passing through the Mannar district. The Mödaragama-oya, being a smaller river, and having, it may be assumed, a comparatively less quantity of sand in its bed, the minimum monthly rainfall needed in order to cause a flow in it may be roughly taken to be 5 inches. The above table thus shews that, on an average, a flow can only be looked for in three months of the north-east monsoon, and one month of the south-west monsoon; though it is possible that in January and May there may sometimes be a small discharge during the first half of the month, the ground being by that time saturated.

6. In my general report on the irrigation of the Mannar district, which was drawn up before the rainfall returns were furnished to me, I stated (paras. 9 and 27) that entire confidence could not be placed in the flow of the Mödaragama-oya, even in the north-east monsoon. During the last decade its flow must necessarily have all but failed in the following years :—

Rainfall at Anuradhapura.

	October	November.	December.
1873	4·53 inches.	6·12 inches.	4·87 inches.
1876	4·57 . .	5·28 „	4·62 „

And in two other years the discharge would be slight, though perhaps enough :—

1870	2·05 inches.	5·45 inches.	7·63 inches.
1871	2·65 „	7·60 „	7·17 „

In the south-west monsoon the fall in May has never exceeded 4·52 inches, and the water supply must have practically failed in four years, their April rainfall being as follows :—

1873	4·51 inches.	1876	5·42 inches.
1874	5·41 do.	1879 .	3·73 do.

8. In two years there must have been a small flow in March, and in two other years a flow in September.

* The return gives 5·30 inches as the mean rainfall for October; I have amended it by adding the rainfall for October, 1879, as measured by the Public Works Department, viz., 8·88 inches.

IRRIGATION.

MANNÂR DISTRICT

Report

9. It will thus be seen that the natural water-supply, though sufficient on the average, would occasionally prove inadequate. But should these irrigation works ever be restored, it will be possible to increase the available water. The Talâwa tank lies under the Yoda-ela, or Jaya-ganga, the channel from the Kala-wewa to Anuradhapura, and it would not be a difficult matter, though entailing a great waste of water, to keep up a constant flow through that tank and down the Môdaragama-oya. The consideration of this point must, however, be left to a future that at present appears to be very remote.

10. The irrigation works under notice consist of an anicut, or *têkkam*, termed the Ussayppu-kallu Têkkam, built across the Môdaragama-oya about ten miles from its mouth; a long unfinished bund, about six miles from the anicut, known by the name of Periya-kattu: and a partly excavated channel, or *alavakka*, intended to convey the ordinary flow of the river to the tank. A shield wall, only, is needed at one end of the anicut, to give these works a general resemblance to those at the Giant's tank.

11. The anicut derives its name from a rocky ridge studded with boulders, about two and a-half miles distant. This spot is known as Ussayppu-kallu (*ussam sayppu*) from a large rock on which are the ruins of some ancient Buddhist edifices, including two rifled and partly-demolished dâgobas. The other buildings appear to have been either wiharas or houses connected with them, and, judging by the style and extent of the ruins, the place must have been of some importance when fully occupied. Nothing whatever is now known of it; but a five-line inscription on one of the rocks, by "Maha Tisa Maharaja, son of Naka Maharaja," probably the Tissa, son of Sirinâga, who reigned, according to the Mahâvaṇsa, from 209 to 231 A D., lends some slight interest to the ruins. It contains a reference to a "Cudânaka" tank, which however cannot be connected in any way with the anicut.

12. The anicut is a straight masonry dam 40 feet wide and eight feet high, carried square across a bend in the oya, at a point where its width was originally 80 feet. Part of the adjoining ground having been washed away, it now appears to run obliquely across; but this is merely with reference to the general line of the river. Its total length is about 400 feet, a considerable part of which has, I imagine, been added in repairing the damage done by the great flood experienced when the work was in course of construction. The banks of the river have been so much eroded by floods immediately below the anicut that this cannot be stated with certainty, but it is more than probable. An anicut 400 feet long, across a small stream would be a monstrosity. Outwardly, it consists of large wedged and partly-dressed stones in mortar, laid in irregular courses; inwardly it is composed entirely of unwedged rubble of medium size, laid in lime concrete.

13. There is little to be said in favour of either the site, or the design, or the construction of this anicut. The merits of the site are summed up in the single statement that it is rocky; in every other respect it must be condemned. It is at an ugly bend in the river, and at a place where the banks are specially low, and where the ground even further away from the stream is little higher. Sinhalese engineers evidently failed to recognise the fact, that although a rocky foundation for an anicut is very desirable, it is not indispensable, and the engineer who laid out these works was also unaware that a much more important point to be attended to is the prevention of the water from washing round the ends. It is in this last particular that the design of the Ussayppu-kallu Têkkam is chiefly faulty. The level of the sill of the dam is little below that of the banks, yet almost nothing has been done to confine the floods to the river. Both ends abut against rocks, through apparently that was at first the case with only one, but these rocks do not rise more than three feet above the masonry, and the small shield-wall built at one end was no higher. The height of the anicut also seems to be greater than is necessary. Its width appears to have been fixed according to the accepted practice of the day, and one might suppose that masonry 40 feet thick would be able to withstand the effect of floods passing over it a few feet in depth, but the state of this dam shows clearly that unless accompanied by a suitable class of work, mere breadth is not of much use. And here the defects of the construction are very apparent. With the exception of a portion of the face, the stones used in the exterior work, the part that of course must withstand the immediate action of the floods, are far too small to bear the shock without displacement. Badly laid and badly fitted, too, it was impossible that they should long remain in position. The mortar, also, was insufficient in quantity and inferior in quality. The whole style of the work invited failure, and the natural consequence is that, even with the small floods of this insignificant stream and the comparatively enormous length of the escape provided for them, the anicut has been breached in three places. In addition to this, the omission to protect the banks has resulted in the stream's cutting for itself a new channel about 80 feet wide round one end of the dam. In fact, not only is the anicut in ruins, but the site is also destroyed.

14. With respect to the reservoir, I can give but little information. The visit I paid to these works with Mr. Haughton was a somewhat hurried one. We crossed the bund on our way to the Ussayppu-kallu Têkkam, and its height at that spot was less than three feet. It is said to be four or five miles long, and other parts of it are stated to be considerably higher than the piece we saw, but all is now covered with a dense mass of thorns, and we could not make any examination of it. The site is, like that of the other large reservoirs of the district, at the upper edge of the plain, and the two arms of the bund run towards the higher forest. The reservoir extends above the bund for about a mile—it

cannot be much more ; beyond that, there is intermediate ground rising towards the forest. In its bed is a small poor village, with a tank called Vattakâval-kulam, it being in the North-Central Province ; the headmen were unable to furnish any particulars of it.

15. The channel from the anicut to this reservoir has been cut for about a-quarter of a mile. There is said to be more, but a search for it in the jungle for a short distance beyond its apparent termination, was unsuccessful. The flood referred to in my general report (para. 39) poured down this channel, and on reaching the end of the cutting burst back through the intervening ground into the river, destroying all trace of the original work. The "Siṭṭâṟu," as the channel has since been termed, is now 30 to 50 feet wide and 15 feet deep, and along its bed are many immense trees that, having gradually sunk into it without losing their hold of the ground when the banks were undermined by floods, have continued to grow in their new position and have assumed most abnormal shapes. It leaves the north bank of the oya almost at a right-angle, immediately above the anicut, but after running about 150 feet it turns sharply downwards, and is continued nearly parallel to the stream until the point is reached where the flood burst into the oya again. At this spot a masonry dam of large wedged stones has been built across the breach, and its ruins now litter the bed of the Siṭṭâṟu. At one end, however, a few feet of the work still remains *in situ*. No trace of a head-sluice is visible. It is just possible that its ruins, which would probably be chiefly of brick, have been carried quite away by repeated floods, but it seems much more likely that its construction was never begun.

16. The area intended to be irrigated is practically a part of the plain, though in reality separated from the rest by a narrow strip of the forest ridge, which runs down to the sea a little further north. These lands are entirely in the Musali South pattu of the Northern Province, the tank and the other works being in the North-Central Province, as stated in paragraph No. 4. The irrigable ground stretches from the foot of the bund almost to the sea, and is bounded on the south by the Môdaragama-oya. Its extent may be 5,000 acres ; I have seen too little of it to make a more accurate estimate of its area. According to the annexed schedule, kindly furnished by Mr. Haughton, there are now in it four villages containing 300 inhabitants and eight tâvadiyûrs, the total extent of fields claimed being 540 acres.

17. To put the whole scheme into working order it will be seen from the description of its present state that expenditure will be needed at the anicut, along the channel, and at the tank. It would, in fact, necessitate an outlay that would only be warranted either by the actual presence of a much larger population than there now is on the irrigable land, or in its neighbourhood ; or by a probability, amounting almost to certainty, that the excellent quality of the soil and the provision of a good supply of water for cultivation, would in a few years attract a considerable number of settlers.

18. The anicut is in such a dilapidated state and the site is such an unsuitable one, and is so much cut up by floods, that instead of thoroughly repairing the dam it would be cheaper and in every way preferable to select an entirely new position for the head-works. Without levels over the ground it is impossible to say whether this would be higher up the stream or lower down. My own opinion is, that unless a considerable amount of earth has already been deposited in the bund, the whole work, including the tank, should be moved upwards, thus rendering the area at present covered by the reservoir—1,000 acres—available for cultivation. If however, an examination of the bund should show that a moderate amount of progress has already been made in the earthwork, financial considerations will probably cause the retention of the existing line of bund to be adopted. This point must be determined by questions of economy. In its present position the tank would be well fitted to impound and supply water for the cultivation of all the irrigable land below it, but a better site could, I think, be found one or two miles nearer the head-works. At either place the reservoir would answer its purpose, but according to my suggestion there would be a gain of 1,000 acres in the extent capable of irrigation, and at the same time one or two miles of channel would be dispensed with.

19. If the tank be retained in its old site it may be assumed that the anicut cannot be moved much nearer to it, unless the engineer who is responsible for the design made an error in the levels, a thing which I have not yet discovered in the case of any ancient Sinhalese work. It may also be assumed that it will not prove necessary to remove it much further up the river.

20. This being so, the cost of the dam, with shield-walls, if built upon rock not more than four feet below the bed of the oya, would be about 20,000 rupees.

21. The distance from the upper part of the tank to the present anicut is approximately five miles, and the length of the channel to connect them would be about five and a-half miles, the cost of which, including the head-sluice, repair of breaches, and provision of escapes for floods, which last would be expensive, may be estimated to be 35,000 rupees.

22. Taking the villagers' higher estimate of five miles as the length of the bund, and allowing a head of water of only eight feet in the tank, the cost of raising the embankment, including puddling and the construction of sluices and a spill-water, cannot be put down at less than 85,000 rupees, if the present condition of the Akatti Muripp bund be considered to indicate the state of that of the Periyakaṭṭu tank.

IRRIGATION.

MANNAR DISTRICT.

Report.

23. The total cost, including non-effective charges and contingencies, will therefore be, approximately, 140,000 rupees. I estimate that for this outlay there would be provided an anicut, 80 feet long, with the necessary protective works on each bank of the stream; a channel in earth, five and a-half miles long, having a base of fifteen feet, with 250 feet of flood escapes; and a tank, holding eight feet of water, with a bund five miles long and twelve feet high, having a top width of six feet and slopes of 2 to 1. Such a reservoir would contain water for at least double the present area of fields, but it would be inadvisable to construct one having a less head. If more water were afterwards needed, the height of the bund could easily be increased.

24. I presume that five per cent. is the lowest rate of interest that should be accepted for expenditure on irrigation, and as the return from the area now claimed under the tank (540 acres) would be only 2,160 rupees (at 4 rupees an acres, which has already been shewn, in my report on the Akatti Murippu tank, to be all that can safely be expected in this part of the district) it is evident that the cost of such a scheme as this is prohibitive under existing circumstances, though the work would prove a profitable undertaking if much more of the land were brought under cultivation. With many thousands of acres of suitable uncultivated land under the more accessible Giant's tank and Akatti Murippu tank, there is not much likelihood that this will be the case for many years to come.

25. It therefore becomes necessary to enquire into the advisability and cost of executing only a portion of these works on a modified scale for improving the cultivation of merely the existing fields. The expected return from these lands being, under full cultivation, 2,160 rupees, an expenditure of 40,000 rupees might perhaps be deemed permissible, seeing that if water be provided there is sure to be eventually some increase in the area sown.

26. Undoubtedly, for very much less than this sum a channel with a base of ten feet might be opened from the Sittâru, the bund of the Periya-kattu tank, from which point the villagers would be able to conduct the water to their present tanks. It could be provided with a strong, but inexpensive head-sluice, consisting of piers with removable planks, instead of the solid structure with cast iron valves which is allowed for in the amount stated in paragraph 21. Some slight repairs executed at the Ussayppu-kallu Tékkam would for many years render it capable of holding up six feet of water, a head that would be ample for diverting a sufficient quantity down the channel.

27. This work would enable the cultivators to obtain water whenever any is in the river, and the particulars of the Anuradhapura rainfall already given show that in nearly every year there would be an absolute certainty of filling the village tanks in October, November, and December. From their small number it is evident that in this part of the district the tanks are more thinly scattered over the irrigable tract than in any other. It will therefore most probably be possible to retain extra water in many of them without flooding the adjoining fields, and perhaps their capacity may be so increased as to hold enough for nearly all the lands claimed. Were the channel opened, sowing would be commenced as soon as water began to flow down the oya—fully two weeks earlier than is now the case; and the storage of considerably less water than is now needed would thus suffice. In the south-west monsoon a good crop would be obtainable at least every alternate year, on an average.

28. Though such a work would be a far less satisfactory mode of meeting the difficulty than the scheme previously dealt with, it would still be an immense improvement on existing conditions, without any extravagant outlay; and as the cultivation gradually extended, the works might be proportionately enlarged and improved. Should it ever be necessary to carry out the whole project in its entirety, the only part of the works now proposed, that would not remain a portion of the complete scheme, would be the rough and comparatively inexpensive head-sluice, and the partly-repaired anicut which would, as above stated, be removed to a new site.

29. I would suggest that, when opportunity permits, a survey should be made with two objects: (1) to ascertain if the last proposal can be carried out satisfactorily at a cost of not more than 30,000 rupees; (2) to find the outlay needed according to the first-mentioned project, and to obtain data that, in case the restricted scheme be adopted, will enable the works to be so designed as to be of use should the larger scheme be eventually undertaken.

HENRY PARKER,
Irrigation Officer.

Giant's Tank,
December 17th, 1880.

SCHEDULE of Tanks and Lands claimed under the Periyakattu Tank, Northern Province.

Name of Village of Tavadiyûr.	Number of inhabitants in 1874.	Tank	Field.		N.E. Monsoon.		S.W. Monsoon.	
		Approx. area in acres.	Total extent in acres.	Area of present field in acres.	Average area sown in acres.	Average crop in bushels.	Average area sown in acres.	Average crop in bushels.
I.—VILLAGE TANKS.								
Musali South Pattu								
Paleikkuli	52	45	134 2-9ths	13 3-9ths	14 2-9ths	280	5 5-9ths	100
Marisikattu	87	45	239 5-9ths	26 6-9ths	30 2-9ths	522	3 2-9ths	67½
Paravaveli	110	10	13 3-9ths	2 2-9ths	1 1-9th	56	nil	nil
Karadikuli	51	25	60 8-9ths	17 7-9ths	16 4-9ths	300	2 4-9ths	40
TOTALS ..	300	125	348	60	62	1158	11 2-9ths	207½
II.—TAVADIYU'RS								
Musali South Pattu								
Hantaikulam	—	5	3 3-9ths	1 7-9ths	1 7-9ths	38½	1 1-9ths	8⅝
Attikuli	—	10	34 6-9ths	11 1-9th	4 1-9th	93	nil	nil
Kumakulam	—	10	6 6-9ths	1 5-9ths	1 5-9ths	22	nil	nil
Aruppappan ...	—	10	16 4-9ths	5-9ths	5-9ths	5	nil	nil
Uvayadikulam .	—	10	11 1-9th	2 2-9ths	2 2-9ths	48	nil	nil
Atusakulam	—	5	7 5-9ths	4-9ths	4-9ths	6	4-9ths	7½
Pahyankulam .	—	25	85 7-9ths	13 1-3rd	9 3-9ths	164	2 7-9ths	62½
Koreimottu	—	25	26 6-9ths	3 5-9ths	2 4-9ths	36	nil	nil
TOTALS ..	—	100	192 2-9ths	34 3-9ths	22 4-9ths	412½	4 3-9ths	78⅝

NOTE.—All areas are computed at the rate of 2½ bushels of sowing extent to an acre.

II.—1881.

CORRESPONDENCE

ON THE SUBJECT OF

POLICE SUPERVISION BETWEEN COLOMBO AND RATNAPURA.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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CORRESPONDENCE

ON THE SUBJECT OF

POLICE SUPERVISION BETWEEN COLOMBO AND RATNAPURA.

The INSPECTOR-GENERAL OF POLICE to the Hon. the COLONIAL SECRETARY.

POLICE SUPERVISION BETWEEN COLOMBO AND RATNAPURA.

No. 78. Colombo, 12th February, 1881.

SIR,—Mr. Hansard, Superintendent of Police of the Western Province, having now traversed and considered the waterway between Ratnapura and Colombo, and submitted his report thereon, I have the honor, with reference to your letter 460 of 13th December last, to lay before His Excellency my views as to the best mode of police supervision of the route in question. They are, briefly, that it should be used only for the forty miles of river between Ratnapura and Kalutara, and that the thirty-five miles of canal and lake should be superseded by the twenty-six miles of railway between Kalutara and Colombo.

2. The suggestion is Mr. Hansard's. It will be found in detail in his interesting report No. 960, of which I append a copy. If it be adopted, I can guarantee the safety of goods between Ratnapura and Colombo, and there should besides be great gain as regards speed and cost of carriage, and also as regards railway revenue.

3. This scheme would cost at first for thorough police supervision some 6,000 or 7,000 rupees per annum. If, on the other hand, the whole route is to be by water, the cost will be 12,000 rupees or more, while the supervision, though undoubtedly beneficial, cannot possibly be thorough.

4. The forty miles of river from Ratnapura to Kalutara are through a country with few villages, and are often traversed in less than a single night, while the remaining thirty-five miles of canal and lake are through numberless villages—the homes of the boatmen, where the inhabitants by years of practice have become adepts in coffee adulteration and theft—and these thirty-five miles abounding in hidden sidings, take sometimes, owing to droughts, head winds, &c., as much as three weeks to get through. I append a map on a very large scale, shewing the whole course from Ratnapura to Colombo.

5. I have talked to a few of the leading merchants on the subject of this suggested route by river and rail, and they seem to approve of it. It would bring down coffee safely and quickly, and even at the Maradana railway station would deliver it as near to most of the stores as it is delivered at present; for it must be remembered that the Ratnapura boats never enter the Colombo lake. But I presume that, were the suggested route adopted, there might be in addition to Maradana a terminus for goods in Slave Island, which would serve many of the firms even better than they are served at present. The freight ought to be less; for by far the greater part of the cost of the water route from Ratnapura is incurred between Kalutara and Colombo. This portion of the voyage, as already stated, sometimes takes three weeks, during which the wages of eight well-paid boatmen are running on. Also there are two tolls on its course.

6. As for the boatmen, we have now almost quite deprived them of the coffee carrying along the whole route, so that they would gain by having it restored to them between Ratnapura and Kalutara. As it is their own bad conduct that has led to the change, they are not to be pitied if the rail supersedes their boats between Kalutara and Colombo.

7. Should His Excellency approve the suggestion I have now submitted, it will be necessary to provide without delay a landing place, siding and sheds, at North Kalutara; and temporary sheds (which the headmen could put up) at Nambapana, Delgoda, and near Kalutara, for a police force, which Mr. Hansard recommends should be as given on the margin, but which I think might be reduced after some experience. A couple of good fast canoes would likewise be necessary.

	Sergeants.		Constables.
Ratnapura ...	0	...	4
Nambapana...	1	...	6
Delgoda ...	1	...	3
Kalutara ...	0	...	4
	2		17
Detectives	0	...	6
	2		23

8. Should it, on the other hand, be determined to keep to the water all the way, the foregoing force may be reduced by perhaps ten men, but then 16 or 18 more with additional housing and canoes will be required, at points to be determined later, on the 35 miles by canal and lake. In either case the few additional police placed on the road between Ratnapura and Colombo for cart registration will be saved.

POLICE SUPERVISION BETWEEN COLOMBO AND RATNAPURA.

9 I append a copy of another report (No. 10,875) from Mr. Hansard, which I called for not long ago. It shews that the registration scheme introduced and worked by the police at the end of 1879 has been a perfect success both as to the safety of coffee and other goods between Badulla and Colombo and the quickness and regularity of transport. If it is to be abandoned now between Ratnapura and Colombo, in favour of the water route, it must be remembered that the abandonment is entirely on account of the failure of the road, and not on account of any failure whatever on the part of the police.

10. The reference to the Bandarawella station in the second paragraph of your letter under reply, I shall report on in another letter.

I have, &c.,

G. W. R. CAMPBELL,
Inspector-General of Police.

P.S.—I beg that the map may be returned to me.

Enclosure No. 1.

Captain HANSARD to the INSPECTOR-GENERAL OF POLICE.

Western Province, Police Office,
Colombo, 26th January, 1881.

Memo. 960.

River Scheme.

WITH reference to your Memorandum No. 236 of 14th January, 1881, calling for a report on the best mode of trying the experiment of instituting police supervision over the river and waterway between Ratnapura and Colombo, I have the honor to report that I have just returned from an inspection of the route, and I am of opinion that it would be very little use trying any experiment as far as the canal and lakes are concerned, but that the river can be protected at a reasonable cost.

2. From enquiries made I have learnt that small fortunes have been made for many years past by the coffee stolen from cargoes on the way from Ratnapura to the Colombo stores, and that the quantity stolen has been made up by wetting or mixing; but until lately no complaints have been made.

3. To effectually prevent the evil, I propose placing the whole river under police supervision at a moderate cost, and offering facilities for the transport of coffee from Kalutara by rail to Colombo.

4. I propose that a landing stage, a goods shed, and a siding be commenced at once, and that arrangements be made for receiving and despatching the next crop (the harvest of which will be in July), and that the charges be fixed at the lowest possible rate that will pay, bearing in mind the return loads of rice, manure, &c., which would come from Colombo by train to Kalutara.

5. Objections to this plan will be raised which, in anticipation, I shall here endeavour to meet. The merchants who have their coffee stores in the Colombo lake will call for the protection of the canal, in order that they may have their coffee brought direct from Ratnapura to their stores with safety. To this objection I would enquire what number of boats loaded with coffee pass through the lock-gate into the lake, as compared with the number that are unloaded into carts at the various landings at and near Colombo. The result of my enquiry from the toll-keeper is, that not a single boat-load of coffee passed through the lock-gate during 1880.

6. The merchants and the railway authorities may object to the rush of coffee that will most likely take place during the height of the spring and autumn crops and block their stores, but by proper management between the Colombo stores and the estates, there ought to be no serious block; and I would further urge that the interest of the grower should be our first consideration—viz., that the coffee despatched should reach its destination with the least possible risk; and as the risk is increased in proportion to the time occupied in transport from the estate, this trivial objection, if raised, should not be admitted.

7. The assertion, oft repeated, that water carriage is the most economical, and breaking bulk is very objectionable, will not hold as regards the old canal route and new route proposed, for the following reasons. The entrance to the canal from the river is roughly thirty-five miles from Ratnapura and thirty from Colombo, while it is only five from the railway station at Kalutara. It takes from two days to three weeks from the entrance to the canal to Colombo, while it only takes from six hours to twenty-four hours from Ratnapura to Kalutara.

8. With high water, fair wind for sailing, fine weather and moonlight nights, the journey from the entrance to the canal can be made in two days, but if a strong head wind is blowing on the lake, or the weather is very wet, the boat is simply tied up until the wind or weather changes. If the water is low on the canal, great difficulties are experienced in that portion nearest Colombo, two days being allowed from Wellawatta, five miles from Colombo, where the canal runs close to the Galle road.

POLICE SUPERVISION BETWEEN COLOMBO AND RATNAPURA.

9. There are two tolls at 1 rupee and 50 cents each on the canal, and there are eight highly-paid men to each boat, which carries from 500 to 1,000 bushels of parchment, according to the height of the water and the honesty of the boatmen. The canal and lakes are lined with villages, and in these villages the boat-owners and boatmen reside. There are about 150 boats carrying coffee: one man on the canal owns eight boats, another six, and another four, but the greater number are owned singly. Of the whole number, I may say half the boat-owners are thieves, and half the quantity of coffee that comes to Colombo by boat is tampered with on the canal and lakes.

10. The plan until lately was, to remove two or three measures and sink the sack of coffee in two or three feet of water, where there was gravel or grass, so that the sack should not be soiled, leave it for ten or fifteen minutes, and then dry the outside of the sack on a rock in the hot sun; but now the boatmen are more cautious. They run the boat into one of the numerous side ellas or canals, and the coffee is there emptied from the sacks on to a carpet of sacking in the bow of the boat, and after well mixing with water, which is thrown on it from a pot, it is put back into the original dry sack and sewn up.

11. The quantity removed from each sack before the wetting commences depends upon the quality of the coffee. If of the best quality, three measures are taken, but from the worst quality one and a-half measure only; because the inferior qualities will not swell. The parchment does not begin to swell until the third day after wetting, and on the sixth day it is at its full size for delivery at the Colombo stores. After the sixth day it begins to shrink, and will go on shrinking until it becomes less than it was originally. So that boatmen will always try to deliver the coffee on the sixth day after wetting.

12. The mixing with refuse coffee is carried on much in the same way, but this is all done near Colombo where the inferior article can be readily purchased and the good parchment as easily sold. See Supreme Court case No. 79 of this Colombo sessions as an example. Both wetting and mixing are carried on with a good division of labour amongst the eight boatmen—one stitching, one wetting, two removing, &c.—until the whole boatload is run through in a short time.

13. By the old plan, where the coffee was removed from the boat, 1,000 bushels was carried; but now that the boatmen have found it necessary to carry on the wetting and mixing inside the boat, 500 to 600 bushels only are loaded, for with the larger quantity there would be no room in the boat to work. A new boat should carry three layers of 60 sacks, one layer of 40, one layer of 30, one layer of 20, and a single row at the top; the bow and stern being free with sliding top, gives the workmen plenty of room to work the boat. There is security in a full load.

14. These are some of my reasons for stating that the water carriage by the canal is not so economical as carriage by train from Kalutara, and, as for breaking bulk at Kalutara, it would be nothing compared to that which goes on in the canal.

15. The boat-owners may complain of our interference with their occupation at which so much money has been made, and enlarge on the difficulties of obtaining return loads, &c., but return loads can be carried by train from Colombo and loaded for the up journey; and as regards interfering with the boat traffic, we have already transferred most of the traffic from the river to the road, and now we merely propose transferring it back again.

16. To protect the river I recommend that all boat licenses be called in at once, and re-issued with an order that the license number be countersunk and painted in large figures on the bow of the boat, so that the number can be distinguished by the police from the shore at a distance say of 200 yards, and that at Ratnapura and Kalutara the arrival and departure of all padda boats be reported at the police stations by the tindal in charge, when all information contained in the way-bill together with the names and villages of the owner, the tindal and the boatmen, shall be given for registration.

17. I propose establishing a head station at Nambapana, sixteen miles from Ratnapura, consisting of one first class sergeant and six picked constables, who will have charge of eight miles of river on each side of their station. I propose stationing four extra constables at Ratnapura, who will have charge of the eight miles out of Ratnapura and occasionally accompany the boats beyond the rapids.

18. A pilot is generally taken from Ratnapura as far as Kollapotta-ella, the last rapid, for which he receives 5 rupees. The Ratnapura pilots should be licensed and made responsible while they are in charge of the boats. From Kollapotta the pilot returns walking in twelve hours. The constable accompanying the boat could do the same, visiting the river at known stopping places.

19. Hitherto there has been no tampering with coffee between Ratnapura and Nambapana, but there is a sandbank at Moragama, a-quarter of a mile below the Ratnapura rest-house, and another at Balabatota, two miles from Ratnapura, where it is necessary to unload at low water. There are two trees lying across the bottom of the river—one at Butsanara, five miles from Ratnapura, and another at Addekarre, both of which should be removed by the Public Works Department, as they give a great deal of trouble at low water, and often necessitate unloading.

20. I propose building a temporary registering station at the entrance to the canal, which can be supplied from Kalutara.

POLICE SUPERVISION BETWEEN COLOMBO AND RATNAPURA.

21. Between the entrance to the canal and eight miles of the Kalutara side of Nambapana, a distance of about twelve miles, I propose having a sergeant and three men stationed midway at a place called Delgoda. At Kalutara I propose stationing four extra constables, and working the whole route with the Kalutara and Ratnapura inspectors.

22. I propose in addition to this force to employ six detective constables, who shall be in direct communication with Colombo, Ratnapura, and Kalutara, and at Nambapana I propose that we should have a double canoe at a cost of about 75 rupees. The proposed River Force will be as follows :—

		Sergeants.		Constables.
Ratnapura	...	0	...	4
Nambapana	..	1	...	6
Delgoda	...	1	...	3
Kalutara	...	0	...	4
		2		17
Detectives	...	0		6
		2		23

23. All arrivals and departures to be registered and reported daily by post when practicable. And all departures from Ratnapura and Kalutara to receive a pass from the police, shewing the height of water according to gauge and the time the boat should arrive at its destination.

A. HANSARD,
Superintendent of Police, Western Province.

Enclosure No. 2.

CAPTAIN HANSARD to the INSPECTOR-GENERAL OF POLICE.

Memo. 10,875. Colombo, 7th December, 1880.

THE road between Colombo and Ratnapura was not constructed for heavy traffic, and owing to floods could never be made a first class road.

2. The registration scheme has been a great success so far, but it will not continue to be a success unless the road is kept in a condition to bear the heavy traffic thrown upon it.

3. Hitherto there has only been a small amount allowed per mile per annum for the upkeep of the road. It is a gravel road lightly metalled in places, and cannot last, with the heavy traffic now passing over it, without heavy expenditure for metalling and an increased expenditure per annum for upkeep.

4. The first article* says that there has been "heavy loss to carters and vexatious delay on the journey." The only loss and delay that I know of was for about a week at the end of October, when the carts were delayed by floods. I passed up the road on the 1st of November, when the water was over my axles, and it was on the 4th that the 300 carts passed up and down in one night when the floods had subsided.

5. There have been no thefts of coffee or rice or of other goods. There has been no loss of coffee and no mixing. In fact, there has been no depreciation in the value of goods dispatched, and there has been a very considerable saving of time on the road.

6. The lock-up room of sheet iron might answer with private estate boats or with a boat company, but the native owners of boats could never be induced to adopt the plan.

7. Owing to the want of a good road, it will be necessary to revert to the river, and to protect the river I would recommend registering stations with a patrol between them, a chain across the river at Ratnapura and at the entrance to the canal, where tolls should be collected, and a canoe at each station.

4. I think it advisable to have a registering station somewhere on the Nuwara Eliya road as near Dikwella as possible. On a former occasion I recommended Welimada as a saving of expense.

A. HANSARD,
Superintendent of Police, Western Province.

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* Newspaper article in the "Ceylon Times."—G. W. R. C.

III.—1881.

GRAIN TAX COMMUTATION.

REPORT

ON THE

COMMUTATION SETTLEMENT OF THE MEDA AND ADIKARI PATTUS OF THE SIYANE-KORALE,

UNDER THE PROVISIONS OF

GRAIN TAX ORDINANCE, 1878.

(*In continuation of Sessional Paper No. XL. of* 1880.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

REPORT ON THE GRAIN TAX COMMUTATION

FOR THE

MEDA AND ADIKARI PATTUS OF THE SIYANE-KORALE.

GRAIN TAX COMMUTATION.

MEDA AND ADIKÁRI PATTUS, SIYANÉ KÓRALÉ

Report.

1. THE Meda and Adikari pattus of the Siyané-kóralé were made a district for the purposes of the Grain Tax Ordinance by the Proclamation of Government dated 24th February, 1880.

2. The commutation of tax was commenced on the 22nd May following, and occupied one hundred and fifty-one days.

3. The prices of paddy were fixed at the same amounts as in the districts previously taken up by the same Commissioner.

4. Results of work are entered in Appendix I., acreage in relation to sowing extents having been calculated as before.

5. The introduction of the Ordinance was everywhere hailed with satisfaction, and annual commutation was invariably elected as the mode of payment.

6. Six appeals against decisions of the Commissioner were lodged with the Government Agent.

7. Appendix III. is a summary of the work done in the Siyané, Héwágam, and Salpiti kóralés. The daily averages in this summary are reckoned over all time, working days, holidays, and Sundays.

8. It will be seen that more than one-third of the land in these three important divisions is held at rates higher than a tithe. The terms upon which the Government would sell its right to levy such rates were duly made known; and it is to be hoped that nothing may occur to check the disposition, which now prevails among the cultivators, to accept the Government offer.

Kendangomuwa, Sabaragamuwa,
25th October, 1880.

A. R. DAWSON,
Grain Commissioner.

APPENDIX.

I.

Results of Work.

1	Number of villages containing paddy-fields and ówita lands	189		
2.	Number of parcels of paddy fields	13,691		
		A.	R	P
3.	Extent of do. do	16,533	3	30
4.	Extent one-half of the produce of which is payable to the Government ...	454	3	22½
	Do one-fourth do. do. do ...	5,269	0	12½
	Do three-tenths do do do. ...	549	2	27½
	Do. one-tenth do do. do. ...	10,255	1	7½
	Do. one-twentieth do. do. do. ...	5	0	0
		Rs	cts	
5.	Amount found payable as annual-commutation	23,510	47	
6.	Rate per acre of do. do.	1	42	

OWITA LANDS

7.	Number of parcels of ówita lands	184		
		A.	R.	P.
8.	Extent of do	169	3	0
9	Extent one-tenth of the produce of which is payable to the Government ...	169	3	0
		Rs	cts	
10.	Amount found payable as annual-commutation	29	0	
11	Rate per acre of do. do.	0	17	

GENERAL

12.	Gross amount of annual-commutation	23,539	47
13.	Average revenue derived annually during the last fourteen years from the sale of grain-taxes on paddy-fields and ówita-lands	21,918	92

GRAIN TAX COMMUTATION

MĒDA AND ADIRĀRI PATTUS, SIYANĒ-KŌRALĒ

Report

II.

Notes.

FLOOD water from the Kelani-ganga causes less mischief to crops in this district than in some others ; still the area of cultivated land which it submerges is considerable and not less than fifteen hundred acres Frequent complaints were heard of the obstructions to water-passage which the railway embankment raises

2. The Mēda-pattuwa is a rich agricultural division, and one which will surely repay whatever attention may be bestowed upon the improvement of its possessions. No better step, preliminarily, could be taken in this respect than the introduction of the Paddy Cultivation Ordinance No. 21 of 1867, so far as it provides for the formation of irrigation districts, the appointment of paddy cultivation headmen, and the repair, improvement, and maintenance of small village irrigation works.

3. My report does not contain reference to lands, no portion of the produce of which is allegedly due to the Government ; but such will be the subject of further report.

4. In 454 acres, 3 roods, 22⅓ perches, one-half of the produce of which is payable to the Government, are included 36 acres and 37½ perches pertaining to the line of railway, and upon which 103 rupees and 23 cents have been found to be payable annually.

5 The Anda-otu tax, equal to three-tenths of the produce of a holding, is unusual and seemingly, save by custom, unauthorized. The portion in excess of one-tenth is supposed by the people to have originated under the Dutch Government in a demand made upon the headmen by a revenue officer of high standing for an increased supply of grain to be used in his stables !

6. No mention is made in this report of quantities of produce, the information regarding which there is reason to mistrust.

7 The chief harvest of the district is yala ; and dewareddiri is the variety of rice most usually grown.

8. Paddy is seldom or never sent for sale to a public market, nor is any large quantity of straw exported from the district.

III.

SUMMARY of Work done in the Siyané, Héwágam, and Salpiti kóralés.

	Siyané-kórale			Héwagam-kórale	Salpiti-kórale	Totally
	Udugaha-pattuwa.	Gangaboda-pattuwa	Meda and Adikári pattus.			
Paddy Fields						
1 Number of villages containing paddy fields and ówita lands ..	74	65	189	128	95	551
2 Number of parcels of do do .	3610	4221	13691	7742	5475	34739
	A R. P	A. R. P.	A R P	A R. P.	A R. P.	A R. P.
3 Extent of do do	3115 2 32½	5459 3 0	16533 3 30	11693 0 2½	8182 2 36	44985 0 21
4 Extent, one-half of the produce of which is payable to the Government	98 1 20	262 3 0	454 3 22½	856 1 2½	377 3 20	2074 1 15
one-fourth do do	1777 3 32½	2132 0 0	5269 0 12½	3039 2 35	1747 0 3½	13965 3 3½
three-tenths do do ..	—	—	549 2 27½	—	-	549 2 27½
one-tenth do do .	1259 1 20	3064 3 10	10255 1 7½	7773 0 5	6057 3 12½	28390 1 15
one-twentieth do do ..	—	—	5 0 0	—	—	5 0 0
	Rs cts	Rs cts	Rs. cts	Rs cts	Rs cts	Rs. cts.
5 Amount payable as annual-commutation	7182 98	7360 63	23510 47	15805 76	13783 61	67643 45
6 Rate per acre of annual-commutation	2 30	1 35	1 42	1 35	1 70	1 50
Ówita Lands.						
7 Number of parcels of ówita lands	24	815	184	1318	992	3333
	A. R P.	A R P.	A R. P.	A. R. P.	A R P.	A. R. P.
8 Extent of do	23 3 0	818 0 13	169 3 0	1401 0 20	1006 2 0	3419 0 33
9 Extent, one half of the produce of which is payable to the Government	—	1 0 26⅓	—	55 2 13⅓	16 0 26⅔	72 3 26½
one-fourth do do	3 2 0	78 3 26⅔	—	241 0 6⅓	5 2 0	328 3 33½
one-tenth do do ..	20 1 0	738 0 0	169 3 0	1104 2 0	984 3 13⅓	3017 1 13⅓
	Rs cts.	Rs cts.	Rs cts.	Rs. cts.	Rs cts.	Rs. cts
10 Amount payable as annual-commutation	1 61	274 74	29 0	438 71	177 95	922 1
11 Do crop-commutation ...	—	—	—	107 0	—	107 0
12 Rate per acre of annual commutation .	0 6¾	0 33½	0 17	0 33	0 17⅓	0 27
13 Do crop-commutation	—	—	—	1 62	—	1 62
General						
14 Gross amount of annual-commutation	7184 59	7635 37	23539 47	16244 47	13961 56	68565 46
15 Do. crop-commutation	—	—	—	107 0	—	107 0
16 Average revenue derived annually during the last fourteen years by sales of grain taxes on paddy fields and ówita lands	7033 88	6901 96	21918 92	16210 81	14372 48	66438 5
17 Number of days the work occupied	68 days	69 days	151 days	101 days	74 days	463 days
18 Number of acres passed daily (average)	46 acres	91 acres	110 acres	129 acres	124 acres	104 acres.
19 Number of parcels of land passed daily (average)	53 parcels.	73 parcels	91 parcels	89 parcels	87 parcels	82 parcels
20 Number of appeals against decisions of Commissioner	—	—	6 appeals	19 appeals	—	25 appeals

IV.—1881.

DESPATCH

FROM

THE RIGHT HON. THE SECRETARY OF STATE

TRANSMITTING

OBSERVATIONS UPON THE PRESENT CONDITION OF THE COFFEE PLANTING INDUSTRY IN CEYLON

AND THE

DEMAND FOR DEVELOPING NEW INDUSTRIES.

Ordered by His Excellency the Governor to be Printed.

COLOMBO
GEORGE J A SKEEN GOVERNMENT PRINTER, CEYLON.

1881.

NEW PLANTING INDUSTRIES.

OBSERVATIONS UPON THE PRESENT CONDITION OF THE COFFEE PLANTING INDUSTRY IN CEYLON, AND THE DEMAND FOR DEVELOPING NEW INDUSTRIES

The Right Hon. the Earl of KIMBERLEY to Governor Sir J. R. LONGDEN, K.C.M.G.

Ceylon.
No. 32.

Downing-street, 2nd February, 1881.

NEW PLANTING INDUSTRIES.

DESPATCH FROM THE SECRETARY OF STATE.

SIR,—I HAVE the honor to transmit to you, for your consideration and report, a copy of a letter which I have received from Sir Joseph Hooker, submitting observations upon the present condition of the coffee planting industry in Ceylon.

Sir Joseph Hooker is of opinion that a systematic attempt should be made to introduce the cultivation of other plants, with a view to founding industries that may in time counterbalance, to some extent, the annual loss now occasioned by the diminution of the yield of coffee.

You will observe that Sir Joseph Hooker proposes that a Commission should be appointed in Ceylon to assist the planters in developing new industries, and I commend this proposal to your careful attention, together with the other suggestions made for the encouragement of the systematic introduction of new staples into the Colony.

I think that the Colonial Government may usefully render assistance to the whole planting community by initiating some such measures as those indicated by Sir Joseph Hooker, without in any way interfering with the efforts of private enterprise.

I shall be glad therefore to learn that you see your way to appoint a Commission in the manner proposed.

I have, &c.,
KIMBERLEY.

Enclosure.

Mr. THISELTON DYER, Royal Gardens, Kew, to the Hon. R. H. MEADE, Colonial Office.

OBSERVATIONS BY DIRECTOR OF ROYAL GARDENS, KEW.

Royal Gardens,
Kew, 12th January, 1881.

SIR,—I AM desired by Sir Joseph Hooker to address you in reference to the constant demands which are now made upon him for assistance in developing new planting industries in Ceylon.

That Island appears to be passing through what may be described, without much exaggeration, as an economic revolution.

As you are aware, the most important industry in which European capital has hitherto been invested in Ceylon is that of coffee-growing. In consequence of the ravages of the leaf disease, the coffee trees have been weakened, and the yield of berries seriously diminished.

The loss to the planters has been very great. The Rev. R. Abbay, who visited Ceylon in connection with the Eclipse Expedition and studied the disease under the guidance of Dr. Thwaites, has made an estimate that up to 1871 the average yield of coffee for five years over the whole Island had been 4·5 cwts per acre, whilst for the five succeeding years the average has only been 2·2 cwts. For the ten years from 1869 to 1878 he estimated the total loss due to the disease as from £12,000,000 to £15,000,000.

So great a disturbance of a large and flourishing industry has necessarily entailed much embarrassment, and even suffering. Even if the remedial measures suggested by Mr. Morris and others, and which are now being investigated by Mr. Marshall Ward, can be applied so as to be practically efficacious, they are in themselves a source of considerable expense, and therefore of diminished profit. It is impossible, therefore, to resist the conclusion that the coffee industry has seen its best days in Ceylon, and can never entirely recover its former prosperity. The result unavoidably follows that on many of the older estates coffee cultivation will be more or less abandoned.

NEW PLANTING INDUSTRIES

OBSERVATIONS BY DIRECTOR OF ROYAL GARDENS, KEW

This has indeed already happened, and we have information of estates of 800 acres being left uncultivated. In other cases the planters have turned their attention with praiseworthy energy to other staples. Hardly a day passes without some communication relating to Ceylon reaching this Department, and the requests which are addressed to us for the supply of seeds and plants are altogether beyond our ability to meet.

Sir Joseph Hooker, for his own part, is extremely anxious to assist, as far as lies in his power, the attempts of the planters to spread their operations over a more varied field than is afforded by a single staple like coffee. He has long foreseen the danger which a colony runs by practically pinning its fortunes to the success or failure of a single cultivation; and he does not doubt that planting in Ceylon will emerge from its difficulties in a far sounder condition than when everything had to give way to coffee.

But it appears to him evident that the period of transition is one of no small difficulty, especially to planters with only moderate capital. The functions of the Royal Botanic Gardens, Peradeniya, include the introduction into the Colony with the aid of this establishment, of new plants of economic value, and this, under ordinary circumstances, especially with the superintendence of the present able and energetic Director, the Ceylon Botanic Garden is properly organised to perform. But at the present moment, from the correspondence and personal interviews which Sir Joseph Hooker has had with Ceylon planters, he is disposed to think that the Botanic Garden is subjected to a strain which it was never intended to bear, and failure to support which may somewhat impair its future usefulness and reputation.

It is true that many of the planters are taking their own steps to obtain the supplies of seeds and plants which they want. But this of course leads in many cases to their addressing their demands to Kew or to the West Indian Botanic Gardens, and so to their imposing an amount of labour on these establishments in no way connected with their proper duties. And in some cases unnecessary trouble and correspondence is caused from a want of careful consideration being given to the suitability to Ceylon of the plants asked for before requests are made for them. Thus, to give an instance, a correspondence has taken place between the Government of Trinidad, the Colonial Office, and this establishment relative to seeds of *Erythrina Umbrosa*, a tree used in Trinidad as a shade for cocoa. Seed of this was duly sent out to Ceylon, as well as living plants in a Wardian case, these having been transmitted to Kew by Mr. Prestoe on the initiative of a Ceylon planter. Dr. Trimen, however, in acknowledging their safe arrival states that a shade tree for cocoa is not required in Ceylon. If, therefore, this view is correct, the trouble connected with this transaction, involving correspondences, raising plants at Kew, transmission to Ceylon, &c., might have been spared. I need not say that Sir Joseph Hooker does not grudge the trouble even in a case of this kind. It is merely brought forward to shew the need of a little organised co-operation with Ceylon, both as regards the Botanic Garden and the planting community, before the resources of other colonies are drawn upon through the Home Government

Sir Joseph Hooker has little doubt that the planters are willing to pay a reasonable price for seeds and plants of new staples, if they can be put in the way of obtaining them. Their own individual efforts in this direction appear to be often ill-directed and costly. Sir Joseph Hooker thinks, therefore, that without relieving the planters in any way of charges which appertain to the business in which they are engaged, and which, therefore, should properly fall on their own shoulders, the Colonial Government might yet give them at this juncture very material aid by using on their behalf the administrative facilities which an Imperial organisation affords.

The plan of action which Sir Joseph Hooker would suggest is the following :—

The Ceylon Government should, in the first place, be asked to appoint a small Commission consisting (say) of the Director of the Botanic Garden, the Planting Member of Council, and some official member of the Ceylon Government.

This Commission, by inquiries addressed to the Government Agents, to the Planters' Association, and to leading planters, might ascertain what new staples are likely to be efficiently taken up, and what probable annual supply of seeds and plants will, for the present, be needed to develope them.

The Commission would then move the Ceylon Government to take the necessary steps to obtain the quantities required in one or more operations, and to arrange for their division amongst the planters. In this way anything like jealousy and disappointment would be obviated, and all the planters who availed themselves of the arrangement would have an equal share of the advantages. An infinity of individual applications to this and other establishments would be put an end to.

It only remains to point out some of the cases to which this plan might be immediately applied :—

Cocoa.—The Government of Trinidad would no doubt, on official application, arrange for the transmission to Ceylon of any quantity of seed properly packed. Possibly also, a supply of the best Venezuelan kinds might be obtained with the aid of the Foreign Office.

Mahogany Seed.—The Government of Jamaica would arrange for a regular supply of this through its Botanical Department.

NEW PLANTING INDUSTRIES.

OBSERVATIONS BY DIRECTOR OF ROYAL GARDENS, KEW.

Teak Seed. This could be similarly supplied by the Madras Government through its Forest Department.

Tobacco Seed.—The best kind of American seed would no doubt by supplied on official application to the Department of Agriculture, Washington, while the Jamaica Government would give the results of its experience in starting and fostering the manufacture of cigars.

Cinchona.—Arrangements might be made perhaps with the Government of Java for a supply of seed of the extremely valuable *Cinchona Ledgeriana.* The Ceylon Government would probably, however, have to offer something by way of exchange.

Vanilla.—Ceylon planters are applying to Kew, and sending to the New World for this plant, notwithstanding that since the failure of sugar it is the principal mainstay of the Island of Reunion.

I need not continue the list, which might obviously be considerably extended.

There is one further point which I may be allowed to touch upon, and with regard to which the Commission might be able to effect something. It would be an extremely desirable thing if the planters interested in cinchona could be induced to combine for the employment of a good Analytical Chemist.

Cinchonas appear in cultivation to vary remarkably in the amount of alkaloids which they yield. A great economy can of course be effected by having the bark assayed from time to time, and then rooting up the comparatively worthless plants. It has been hitherto the practice to send the bark to England for analysis. But with the rich barks, which it is now the object of every one to cultivate, it is of great importance to have numerous assays made on the spot.

Dr. Trimen was of opinion that in the event of the Hakgala Garden receiving a greater development, it might be desirable to seek for a future Superintendent with sufficient chemical knowledge to undertake work of this kind. Sir Joseph Hooker doubts the feasibility of such an arrangement. He thinks however, that in whatever way the salary of such an official is provided, he might be conveniently furnished at Government expense with a laboratory in the Colombo Museum.

I am, &c.,

W. T. THISELTON DYER.

V.—1881.

CATTLE TRESPASS.

RETURN to an Order of the LEGISLATIVE COUNCIL of CEYLON, dated 10th November, 1880.

"That a Return be furnished shewing the number of Cases instituted in each of the Police Courts of the Island under the Cattle Trespass Ordinance, No. 9 of 1876, from the passing of that measure to 30th September last; the number of Convictions; the Appeals taken; and the Affirmals by the Supreme Court upon such Appeals."

(*The Hon. J. P. Obeyesekere.*)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

CATTLE TRESPASS.

RETURN shewing the number of Cases instituted in the several Police Courts of the Island under the Cattle Trespass Ordinance, No. 9 of 1876, from the passing of that measure to the 30th September, 1880; the number of Convictions; the Appeals taken; and the Affirmals by the Supreme Court upon such Appeals.

Police Court	Number of Cases instituted	Number of Convictions	Number in which Appeals were taken	Number affirmed by the Supreme Court
Anurádhapura	27	14	—	—
Avisáwélla	108	13	—	—
Badulla	74	2	—	—
Balapitiya	74	4	—	—
Batticaloa	8	2	—	—
Chávakachchéri	145* / 83†	12 / ‡	1	—
Chilaw	11	4	—	—
Colombo	91	10	5	2
Dikoya	2	—	—	—
Dimbula	3	3	—	—
Galagedara	384	43	3	—
Galle	148	15	4	—
Gampola	69	20	2	—
Haldumulla	2	—	—	—
Hambantota	—		—	—
Jaffna	84	20	1	1
Kalmunai	—		—	—
Kalpitiya			—	—
Kandy	22	2	1	—
Kalutara	65	7	2	1
Kayts	142	16		—
Kégalla	140	15	3	2
Kurunegala	51	3	—	—
Matara	54	10	3	3
Mahánkam	12	12	2	1
Mannar	2	1	—	—
Máturé	17	16	—	—
Maturata	8	2	—	—
Mullaittívu	6	7		—
Nawalapitiya	31		—	—
Negombo	399	31	1	—
Nuwara Eliya	26	12	—	—
Pánadurá	92	26	4	4
Panwila	34	9	—	—
Pasyála	267	7	1	—
Point Pedro	118	4	—	—
Pusselláwa	8	1	1	—
Puttalam	3	—		—
Ratnapura	79	12	2	—
Rakwána	5	—	—	—
Tangalla	8	6	—	—
Trincomalee	9	1	—	—
Urugala	21	2	1	1
Vavuniyá-Vilánkulam	—	—	—	—
Total	3,141	266	37	16

* Cases in which the owners were known.
† Cases in which the owners were not known.
‡ Not stated

VI.—1881.

DRAFT ORDINANCE ON CRIMINAL PROCEDURE.

DESPATCH

FROM

THE RIGHT HON. THE SECRETARY OF STATE

ENCLOSING

A MEMORANDUM BY SIR JOHN BUDD PHEAR, KT., ON THE OBJECTS AND REASONS OF THE DRAFT BILL.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J A SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

CRIMINAL PROCEDURE.

DESPATCH FROM THE RIGHT HON. THE SECRETARY OF STATE ENCLOSING A MEMORANDUM BY SIR JOHN BUDD PHEAR, KT., ON THE OBJECTS AND REASONS OF THE DRAFT BILL.

The Right Hon. the EARL of KIMBERLEY to Governor SIR J. R. LONGDEN, K.C.M.G.

Ceylon.
No. 19.

Downing-street,
24th January, 1881.

SIR,—WITH reference to my despatch No. 198 of the 13th of December, I have now the honor to transmit to you a copy of a letter from Sir John Phear, enclosing a Memorandum of the "objects and reasons" of the draft Ordinance of Criminal Procedure. As it appears from your despatch No. 259 of the 14th of December, that the Ordinance is likely to be introduced into the Council shortly, I forward the Memorandum at once, without waiting to have it printed in London.

You will no doubt find it convenient to have it printed in the Colony, and I shall be glad to be furnished with some copies.

I have, &c.,
KIMBERLEY.

Enclosure.

Sir J. B. PHEAR to Mr. EDWARD WINGFIELD, Colonial Office.

Marpool Hall, Exmouth,
18th January, 1881.

SIR,—IN your letter to me of the 2nd December last, you were good enough to enquire whether I wished any explanatory Memorandum to accompany the draft Ordinance of Criminal Procedure in Ceylon, which was then about to be sent to the Colony; but unfortunately, at that time, pressing engagements on other matters left me no leisure for any attempt to give effect to your suggestion.

I have just now however put together, in the brief statement which I forward to you by book post, some of the principal "objects and reasons" of the proposed new procedure: and perhaps it may be of some convenience to the Legal Advisers of the Ceylon Government to receive this, notwithstanding the delay in furnishing it to you, which I regret to say has been due to my fault.

In the event of this statement being printed, may I be allowed to have a copy?

I am, &c.,
J. B. PHEAR

ADMINISTRATION OF JUSTICE CODE.

PART III.

Ordinance on Criminal Procedure.—Objects and Reasons.

THE general scope of the proposed Administration of Justice Code, of which this draft forms Part III., is explained in the letter that I had the honor of addressing to His Excellency Sir James Longden, K.C.M.G., Governor of Ceylon, on the 26th August last year (1879), just before I left the Island.

In that letter I endeavoured to state briefly the more important of the grounds which seemed to me to render "an exhaustive code of procedure and practice absolutely essential to the proper working of our courts" in Ceylon. And I had previously, in a letter dated the 9th May, 1878, pointed out to His Excellency, in some detail, that there were serious shortcomings in the machinery for the administration of justice in the Colony, and that the Justices of the Peace, the Police Magistrates, and the Commissioners of Courts of Requests manifested, as a rule, want of knowledge of the practice of courts, of the business of their office, and of the law which they have to carry out and conform to.

To these letters I venture now to refer for the principal "objects and reasons" of the more important changes in criminal procedure which are embodied in this draft.

CRIMINAL PROCEDURE.

OBJECTS AND REASONS OF DRAFT BILL.

The mischief to be cured may be shortly summarized under two principal heads:—

I.—Evidence is very perfunctorily taken by the courts. Magistrates are content to receive and record such narrative, as the witness offers them, in the crude form of general concrete assertion or statement of fact, and bare of all circumstance and detail.

II.—The general course of the inquiry and carriage of the investigation in criminal cases is dilatory, imperfect, and wanting in careful and precise attention.

It need hardly be remarked that the first object of the court or magistrate in a criminal case is to elicit from the witnesses as many of the simple facts and circumstances of the occurrence, which constitutes the foundation of the charge, as can conveniently be done.

And when there are opposing versions of it given by the two sides, it is most important that that of each side should by means of questioning be presented to those witnesses of the other, who profess to be able to speak about it; and what these latter answer with regard to its principal features, by way of explaining, supplementing, or denying them, should be carefully noted.

Under a process of close investigation of details, made at the earliest moment, in which the witnesses one after the other are persistently confronted with the facts involved in the story of the opposite side, it is scarcely possible that in any but exceptional cases a false accusation can live. While with the habit, which prevails in the criminal courts of the Colony, of accepting the concrete and general assertions of witnesses in lieu of probing for the facts observed by them, the evidence of a false witness can seldom be distinguished from that of an entirely honest man, and false cases can be fabricated with complete success and impunity.

It is therefore a primary aim of the procedure prescribed in this draft to render the magistrate's inquiry more searching and effective than it commonly is under the existing system.

The method in which the inquiry is to be initiated is simplified and made the same for all classes of cases; to this end the functions of as well the Justice of the Peace as Coroner are, by the operation of Part I. of the Draft Code which deals with the constitution of courts, added to and merged in those of the Police Court It is intended that all cases of criminal inquiry whatever, whether founded upon the application of a private complainant or otherwise, should initiate in the same court in the same manner; and that the difference of procedure to be followed according as the case proves to be one, which is capable of being finally dealt with by that court or not, should be matter to be observed by the court itself without any change of tribunal as the hearing proceeds. To make an ignorant complainant himself responsible for the right choice, between the Police Court and the Justice of the Peace, of the tribunal to which he should have recourse for justice (as is practically the case under the present system, notwithstanding that the same officer is generally both Justice of the Peace and Police Magistrate) not merely places a needless obstruction in the path of justice, but also too often gives rise to not a little scandal. I have known instances of a complainant being bandied from the Police Court to the Justice of the Peace (even when the two offices were actually filled by the same person) and back again without being able, in spite of much expenditure of time and an intervening appeal to the Supreme Court, to get his case heard and determined.

There seems, moreover, no longer any need to keep the jurisdictions and functions of the Coroner apart from those of the Police Magistrate. At this day no apparent advantage of any kind is to be derived, or is even aimed at, by prosecuting the Coroner's inquiry through the means of a jury. The reasons which serve to justify and maintain the institution in England are mostly of a historical character, and such as to have no place in the Colony; while it is notorious that a native jury empanelled from among the neighbours of those, who may have been concerned in the death, are seldom led by the evidence to anything other than an open verdict. And, as at present worked, the Coroner's court, regarded simply as as auxiliary to the Justice of the Peace, is almost without efficiency in the administration of justice. The Coroner is not supposed to have power to commit for trial the person against whom his jury (in the rare instance of such a thing happening) may have returned a verdict; and therefore in such cases fresh proceedings are initiated before the Justice of the Peace, which, although often of so slight a character as to be wholly unreal, are yet productive of loss of time and harassment to witnesses, which might be saved with great public advantage. All the objects of a Coroner's inquest will, I think, be secured, by imposing on the Police Magistrate (as is done by this Draft Code) in the event of his receiving information of the occurrence of a death under suspicious circumstances, the duty of proceeding at once to the body, and there instituting an inquiry into the cause of death by the taking of evidence reasonably sufficient to enable him to adjudicate whether there is, or is not, ground to call upon any known person to answer a criminal charge of homicide If he adjudicates this issue in the affirmative, then it will be his duty to proceed on the footing of his adjudication substantially in the same manner as if the charge of homicide had been preferred at the Police Court by a complainant in ordinary course, and been supported by evidence sufficient to justify the court in issuing process against the accused person.

In all cases alike the charge, which the accused person is in the first instance called upon to meet, is to be formulated by the Magistrate himself from the materials which he obtains by a preliminary examination of the accusing party or other persons; and when it is necessary to issue process, whether summons or warrant, to secure the attendance of the accused person before the court, this charge is stated therein. In order, too, that the preliminary inquiry of the Magistrate should be as little formal as may be, and because the veracity of a native witness depends in no appreciable degree upon the sanctions imposed by our courts, the initial examinations taken previously to there being an accused person before the court and while the Magistrate is engaged in ascertaining so much of the facts as may be requisite to enable him to judge, whether process should be issued or not, are effected without the administering of an oath or affirmation.

As soon as the accused person is before the court it becomes the duty of the Magistrate to take his plea to the formulated charge, and to proceed with the investigation and the hearing of the matter of that charge, either at once or on an early day to be then fixed with due regard to the convenience of the parties concerned and the interests of justice.

At the hearing so fixed, if the Magistrate at any time in the course of it is led to consider the case as one falling within his jurisdiction, he is to *try and determine* it on such evidence as may be adduced, making any necessary adjournments; and proceeding either to convict and sentence, or to acquit, according as that evidence may guide his discretion.

If, on the other hand, he considers the case to lie beyond his jurisdiction, he is to carry on the investigation as preliminary to final trial by another tribunal, and eventually *to commit for trial* generally without specifying the tribunal; but if at any stage of the investigation he is satisfied that there is no case to be tried, it will be his duty to discharge the accused person, although by reason of his jurisdiction not enabling him to determine the matter, such discharge will not be a bar to the re-prosecution of the accused person on the same charge.

On the accused person being committed for trial, all the proceedings and depositions in the case, inclusive of the committal, are to be transmitted by the Police Court to the Queen's Advocate's Department at Colombo, which is to determine in what court—*i. e.*, whether in the District Court or in the Supreme Court—the committed case is to be tried, to revise and (if necessary) re-frame the charge for trial, and also to have power at its discretion to direct further investigation, to order fresh evidence to be taken, and even to withdraw the charge altogether.

To discharge these functions efficiently the Queen's Advocate's Department will doubtless need strengthening at head-quarters; but this may be economically effected by substituting an additional officer in the Department at Colombo, to be especially charged with the care of the prosecutions throughout the Island in lieu of the existing local Deputy Queen's Advocates, who with that arrangement might advantageously be dispensed with, as I have elsewhere more fully pointed out.

In my letter of the 26th August, 1879, I alluded to the fact that the Police Courts by a considerable usurpation of jurisdiction dispose of the bulk of the ordinary crime of the country. The mode in which this state of things has come about, though not difficult of explanation, need not be dwelt upon here. One of its principal consequences, however, must not be overlooked, namely, that crime is not adequately dealt with in the Island. This arises in a large degree because the Police Court measure of punishment is necessarily very limited, and short terms of imprisonment have for various reasons no great deterrent effect with the native population. The number of offences in the statute book, which are purely the creatures of legislative enactment, and to which the people themselves attach no idea of wrong conduct or turpitude, is strikingly great. The infringement of such laws as those against felling timber in the jungle or removing timber from private lands without a permit, those against selling arrack or toddy without a license, those against playing any game of chance in a public place or in a promiscuous company, those affecting the relation of master and servant, those enforcing the money commutation of the universal liability to labour on the highway, as well as many regulations of municipal and bazar police, are regarded with as little social disapprobation as was the case formerly with smuggling in England. And for all these on conviction imprisonment is practically the only punishment, inasmuch as on account of the generally prevailing poverty, the imposition of a fine means in effect the sending of the convicted person to jail. It must be added, too, that it is largely the practice with the police, on the occurrence of a crime under circumstances which offer difficulty of investigation, to arrest and keep in custody every body who is thought likely either to have been concerned in it or to be able to give evidence relevant to it. I have known a case of this kind where a whole village has been carried off to the lock-up at a distance of many miles, and kept in detention many weeks. Police Magistrates and Justices of the Peace, also, not unfrequently cause witnesses to be detained in prison, pending the inquiry and until trial, in order to ensure their being forthcoming when wanted, and to prevent their being tampered with in the interval; and committals for contempt of court are numerous to a degree that is surprising to those who know how rarely they are found to be needed in England or in India. In all these several ways combined imprisonment has come to be a very common fate, which may well enough befall almost any one among the native population of Ceylon without carrying with it any real social disgrace. Thus, as a means of punishment, it has lost its most

CRIMINAL PROCEDURE.

OBJECTS AND REASONS OF DRAFT BILL.

effective quality; and it has become worse than useless for the Police Court, at an expense of time and attention that is greatly needed for the better discharge of its proper functions, to attempt as a court of final disposal to keep down the serious crime of the Colony.

With this view the summary jurisdiction of the Police Court to try and determine cases coming before it is strictly limited and marked out in the schedule to Part I. of the Draft Code. In order also to increase the efficiency of the court and to adapt it, as I have partly explained in my letter of the 26th August, 1879, to the more complete performance of the duties which now fall to the Coroner and the Justice of the Peace, as well as to afford an opening for the introduction of the native element into the judicial service, an object which I consider most important, power is given to the Government in Part I. to appoint several Magistrates of differing grades to the same Police Court with powers of corresponding degrees, which are discriminated in the schedule thereto. This gradation has rendered necessary some few special provisions in the procedure.

The foregoing remarks are perhaps sufficient to indicate the reason for so much of the structure of this draft Ordinance as may seem to require explanation on account of its novelty; and I will only add that while in accordance with the proposal, which was approved of by the Secretary of State, the Indian Code has been as closely as may be followed in the details of the procedure here prescribed, at the same time it has been the object of the draftsman to adjust it, as a whole, in such a way as best to meet the peculiar circumstances and needs of the Colony.

In particular, it has been especially his aim, in so much of the code as bears upon the administration of criminal justice, to lead up to and promote the following ends—

That all criminal inquiries should initiate in the same court—namely, in the Police Court—in one uniform manner; and that the Magistrate be responsible for the framing of the charge, which the accused person is primarily called upon to answer, and also for the thoroughness of the investigation of the facts.

That the summary jurisdiction of the Police Court be confined within well-defined limits comprehending comparatively trivial offences, and be prevented from extending itself to such crime as, needing severity of punishment for its repression, or grave consideration, seems to demand the more solemn and cautious method of trial.

That this latter body of crime, with the exception of cases, the nature or circumstances of which are such as to render trial by jury before the Supreme Court desirable, be finally tried by the District Court on the foundation furnished by the preliminary inquiry in the Police Court.

That the Queen's Advocate's Department be charged with the direct control of the preliminary investigation in all cases destined for regular trial by the District Court or Supreme Court, and with the right appropriation of such cases to those courts respectively, and generally with the care of their full and complete prosecution; and that for this purpose the Department be centralized by the abolition of the existing machinery of local Deputy Queen's Advocates, and, if necessary, be reformed and strengthened.

VII.—1881.

REGISTERED GUNS AND SHOOTING LICENSES.

RETURN to an Order of the LEGISLATIVE COUNCIL of CEYLON, dated 8th December, 1880.

"That a Return be furnished shewing the number of Guns appearing as registered in each Kachcheri, and a Statement of the number of Shooting Licenses issued under the Ordinance No. 6 of 1872, since it came into operation: *(a)* to Europeans; *(b)* to Natives."

(The Hon. R. B. Downall.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

REGISTERED GUNS AND SHOOTING LICENSES.

ABSTRACT of Returns shewing the number of Guns registered in each Kachcheri, and the number of Shooting Licenses issued under the Ordinance No. 6 of 1872, since it came into operation, to (a) Europeans; (b) Natives.

Kachcheri.	Number of Guns registered.	Licenses to kill Game issued to (a) Europeans.	Licenses to kill Game issued to (b) Natives
Colombo ..	6,351 from 1873 to 1880	3 from 1872 to 1880 and 7 to shoot buffaloes	—
Ratnapura .	743 do. ...	— ...	—
Kégalla ...	1,136 do. ..	..	
Kalutara ...	151 from 1876 to 1880 .	— ...	—
Negombo	1,406 from 1875 to 1880 ...	— ...	—
Galle ...	3,263 — ...	64 — ...	10 —
Hambantota ...	3,435 — ...	40 —	19 —
Matara ...	2,902 — ...	— ...	—
Kurunégala ...	1,656 from 1873 to 1880 ..	22 up to 31st December, 1880	8 up to 31st December, 1880
Puttalam ..	723 do	— ...	—
Batticaloa . .	1,458 up to 10th January, 1881	51 — .	16 up to 18th January, 1881
Trincomalee .	261 do ...	10 — ...	—
Jaffna ..	246 from 1st January, 1873, to 30th November, 1880	54 from 1st January, 1873 to 30th November, 1880*	3 from 1st January, 1873, to 30th November, 1880
Mannár ..	148 do. ...	— ..	—
Mullaittívu ...	148 do ..	-- ..	—
Vavuṇiyá-Viláṇkulam	11 do. ...	— .	—
Kandy ...	6,156 — ..	20 from 1872 to 1880 ..	—
Badulla	1,480 — ..	— ..	—
Nuwara Eliya ...	209 — ...	— ..	—
Matalé ...	1,292 — ..	— ...	—
Anurádhapura ..	767 from January, 1874, to March, 1880	14 from January, 1874, to March, 1880	—
Total ...	33,942 Total ...	278 Total ..	56

* All Licenses to shoot Game in the Northern Province are issued from the Jaffna Kachchéri only

VIII.—1881.

REPORT

ON

THE "PARANGI DISEASE" OF CEYLON,

PREPARED BY

W. R. KYNSEY, ESQ., M.K.Q.C.P.I., L.R.C.S.I.;
PRINCIPAL CIVIL MEDICAL OFFICER AND INSPECTOR-GENERAL OF HOSPITALS, CEYLON.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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REPORT

ON

THE "PARANGI DISEASE."

INTRODUCTION.

PARANGI DISEASE.

INTRODUCTION TO REPORT.

ALTHOUGH the existence of an obstinate chronic endemic disease has been known to exist in Ceylon for centuries, it is only within the last few years the subject attracted the serious attention of Government, and that attempts have been made to arrive at a correct opinion as to its origin, nature, and treatment.

The following remarks, in 1866, by the Committee of the Legislative Council on Irrigation Works and Rice Cultivation may be said to have commenced the enquiry :—

The frequent outbreaks of cholera, said to be introduced by Tamil immigrants, and the prevalence amongst the people for many years past of a very fatal disease reported to be of a syphilitic character, have committed great ravages. The Agent reports that last year the entire population of a village, with the exception of three of the inhabitants, was carried off by cholera. It may be further remarked, in reference to the loathsome disease already alluded to, that in the Vanni no man, woman or child is believed to be free from it. The Committee are of opinion that a professional enquiry should be instituted into the character and progress of this scourge with a view to its mitigation.

In consequence of the above remarks, Colonial Surgeon Dr. James Loos, an experienced officer of the Department, was selected to report upon Parangi, with the following instructions from the Principal Civil Medical Officer, Dr. Charsley :—*

I have the honor to inform you that His Excellency the Governor has been pleased to appoint you to report on the subject of the depopulation of the Vanni district, as recommended by the Irrigation Commission

Th disease, commonly known by the term "Parangi," will naturally become the special object of your enquiry. Its history, the variety of its symptoms from its earliest stages to its termination, its influence on the health and longevity of the population, its predisposing causes, in regard to the habits, customs, diet, &c., of the people, and its hereditary tendency, are all points of interest into which I would suggest enquiry to be made, and—above all—as to whether there are any grounds for supposing that the disease is in any way connected with "syphilis."

I would, however, prefer to leave the details of the enquiry entirely to your own judgment, rather than to embarrass you with any instructions from myself

You are at liberty to select your own time and the districts you may desire to visit, keeping in mind that a full report is more to be desired than expedition in its compilation

I beg to enclose you some remarks which have been made on the subject by Mr Russell, which have been forwarded to me by Government :—

"As the attention of the Principal Civil Medical Officer has been called by Government to the depopulation of the Vanni, or Bintenna districts of the Island, by the ravages of a disease, of which the precise character has yet to be ascertained, I take the liberty of offering a few remarks which may possibly tend to further the enquiry on this subject.

"In a Memorandum on the Demala-pattu, which I submitted to Government in 1860, I noticed the disease in the following terms :—

"'This is the Parangi or Spanish-pox, of which many of the diagnostics are more or less syphilitic, although its origin is rarely, if ever, venereal. The Parangi arises in the majority of cases from a cut or scratch, which refuses to heal in consequence of the impoverished state of the patient's blood. The virus then attacks the system, generally breaking out first in pustules on the face, and eventually covering the whole body with ulcers, while the sufferer rapidly declines in health and strength. The sickness is not often immediately fatal, but it is tedious and entirely ruins the constitution of its victim. The principal medicament used for it by the natives is 'seenappa,' a kind of yam.† The Parangi is caused by a miserable diet, of which the chief constituent is a grain called kurakkan ‡ It bears considerable resemblance to the disease known as 'Pellagra,' which commits fearful havoc among the peasantry of Spain, Southern France, and Northern Italy. The Pellagra originates in the employment as food of diseased grain, and exhibits the symptoms of some cutaneous eruptions and frightful debility.'

"It appears to me that in order that the proposed enquiry may be effectual, it should be conducted by one or two active and intelligent Medical Officers, who should visit every portion of the Island in which the malady is endemic, and should carefully note the variations, if any, which it exhibits under different conditions of climate, and the modifications, if any, which domestic habits

* Instructions to Dr. Loos, dated February 19th, 1868.
† Smilax chinensis.
‡ Eleusine Corocana.

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and diet cause in it. For example, when travelling during last year in the Tamankaduwa-pattu of the Eastern Province, I was struck by the contrast between the evident healthiness and vigor of the indigenous Moors and the haggard, sickly appearance of the Siṇhalese, their neighbours. What is the cause of this contrast ?

"It seems necessary that the same person or persons should visit all the localities which may be chosen for the collection of data, in order to be in a position to form an accurate estimate of such data and of their relative value. The experience gained by the enquirer as he proceeded with his task would, it may reasonably be hoped, enable him to note many minor points which might escape the attention of a person newly engaged in the investigation, and still uncertain as to the best mode of conducting it."

Dr. Loos furnished a valuable report, which will be found in the appendix, and on his recommendation hospitals were established at Mullaittívu and Vavuṇiyá-Vilánkuḷam. Little else seems to have been done towards investigating the disease until the term in use attracted the attention of Dr. Gavin Milroy, when in 1872 he came across it in reading the hospital reports sent home to the Colonial Office. The following correspondence will indicate the course of the enquiry up to date. Too much credit cannot be given to Dr. Gavin Milroy for the interest he has always taken in the investigation of the epidemic diseases of the colonies. It is mainly to his writings and to the valuable work of Drs. Tilbury Fox, T. Farquhár, and V. Carter, "On the Skin and other Diseases of India and Hot Climates generally," that the present report on the Parangi Disease of Ceylon is due.

Dr. Milroy, writing to the Under Secretary of State for the Colonies in August, 1872, acknowledges the receipt of Ceylon Hospital Returns, and remarks :—

"The Colonial Surgeon of Colombo, Dr. Loos, writes that opinions have been freely expressed in this country that the *Parangi disease*, endemic here, is capable of being propagated by vaccination, &c * I am unacquainted with the nature of the malady by that name The technical or medical appellation of it should be given

Dr. Charsley, writing in March, 1873, in reply, says :—

With regard to Dr Milroy's enquiries into the nature of the Parangi disease, I have the honor to state that it has no technical appellation, but it is a form of disease which pervades certain parts of the interior of the Island and very seriously affects the population.

There is a difference of opinion among medical men as to its real nature and origin, some believing it to be of a syphilitic origin, while others think that it is of the nature of a land scurvy, aggravated by scrofula

Dr Loos was appointed, on my recommendation, to travel through those portions of the interior where the disease most prevailed, and was said to be depopulating the country. I cannot do better than attach to this communication copy of Dr. Loos's report. An effort is being made by Government to check the progress of this disease by direct treatment, and a very intelligent medical officer has been stationed in its centre He has furnished an able report on the histology of the disease, which will be attached to my annual report for last year.

Dr. Milroy, writing in June, 1873, to the Under Secretary of State for the Colonies, acknowledges letter from Dr. Charsley and report by Dr. Loos, and remarks :—

On perusing the last named document, I have been much struck with the marked analogy, in various respects, of this Ceylon endemic with the disease of Yaws in the West Indies.

Whatever throws light on the one, will doubtless serve to elucidate the other, and I therefore venture to suggest that Dr. Charsley's attention be drawn to the account of the latter malady, in the description of it by Dr Imray of Dominica and Dr Bowerbank of Jamaica, given in my recent report

Dr. Loos, writing in October, 1874, in reply to Dr. Milroy, says:—

Previous to Dr Charsley's departure from the Island he sent me Dr. Gavin Milroy's "Report on Leprosy and Yaws in the West Indies," and copy of a letter addressed by the latter to the Under Secretary of State for the Colonies, wherein he says that, having read my report on the Parangi disease, he was much struck with the marked analogy, in various respects, of this Ceylon endemic with the disease of Yaws in the West Indies, and suggests that Dr Charsley's attention be drawn to the description of Yaws by Dr Imray of Dominica and Dr Bowerbank of Jamaica, as given in Dr. Gavin Milroy's report.

Dr. Charsley in his letter to me, desired that as he had not time to give attention to the subject, I would express my views for the information of Dr Gavin Milroy.

I have read the portion of the report relating to Yaws with much attention and interest. I may, however, state that I was not altogether ignorant of the existence of Yaws, and the possibility of Parangi disease being allied to it One of the medical practitioners at Jaffna actually called it *Frambœsia*, and before drawing up my report I consulted, among other authorities, Dr. Copland's Dictionary of Medicine and the Treatise on Diseases of Skin by Dr. Schedel in Dr. Tweedie's Library of Medicine, in both of which I thought there were good descriptions of Yaws. The late Mr. Russell, then Government Agent of Jaffna, had suggested the resemblance of Parangi disease to *Pellagra*; and others called it *Land Scurvy* I thought that it corresponded to descriptions of *Sibbens* or *Sivvens*, which formerly prevailed in the south-west of Scotland. Dr. Imray, in his report, states that Yaws, in the West Indies, was compared to the same complaint After careful consideration, however, I dismissed the idea of any very close resemblance of Parangi

* I may here state that there is absolutely no foundation for the statement that Parangi is propagated by vaccination. The disease prevails most extensively in districts where, owing to its presence, it is impossible to carry on vaccination.

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disease to Yaws, and the clear descriptions of the latter disease given in Dr. Gavin Milroy's report have tended, still further, to strengthen my conviction that the two diseases are not identical.

Since writing my report, I have not had opportunities of further observing Parangi disease, as I was shortly afterwards removed from Jaffna, and in the hospitals of Kandy and Colombo, where I have since worked, cases of it are very infrequent. I may state, in this connection, that it was my original intention to have pursued the study of this disease more closely than I have yet done, with a view to elucidate any points of resemblance or difference before drawing up the present report; but as no favorable opportunities have as yet occurred for such study, I am unwilling to defer expressing my views on the question referred to me any further.

Although I have thirty years of professional experience in Ceylon, I was but slightly cognizant of the existence of Parangi disease, and had no idea that it was so severely or extensively prevalent till I was sent to investigate it in the Vanni District. Cases are very rarely met with in the towns, and the disease exists only in the interior of the Island, especially in the Northern, North-Central, and North-Western Provinces. Credit is due to the Government Agents of these Provinces for having drawn the attention of Government to it, but more especially to the Irrigation Committee appointed by the Legislative Council in 1866, for having pressed an enquiry into the character and progress of this scourge with a view to its mitigation. Dr Charsley, as Head of the Civil Medical Department, has not been slow to adopt the measures suggested in my report, and approved of by Government. Among the principal steps taken are the formation of a Medical School for increasing the number of well-informed medical practitioners, not less urgently required throughout the length and breadth of Ceylon than in the West Indies; the establishment of a hospital at Vavuniya-Viláṅkulam, the centre of a largely-infected locality; and the assignment of wards, in some of the other hospitals, for the special cure of the disease. These steps will no doubt contribute to our better knowledge of the disease, as well as to the amelioration of the sufferers, and the more indirect measures which are now so earnestly engaging the attention of the Government for the restoration of the ancient tanks and the general advancement of the districts where they exist, will diminish and perhaps in time extirpate the malady.

The previous want of attention to Parangi disease has not, in my opinion, arisen from indifference on the part of Government or the Medical Department. I am rather inclined to think that the disease has forced itself on our attention by its increased prevalence of late. It is certain that the depopulation of the Vanni, from other causes more than from its prevalence, has been operative in bringing it prominently to notice. As one of the fruits of the inquiry which has been thus directed to Parangi disease, we have the report of Dr. Danforth, who was placed in medical charge of the hospital at Vavuniyá-Viláṅkulam on its establishment in 1872. He writes after six months' observation of the disease; and in instituting a comparison between Yaws and Parangi disease, I shall avail myself of his description of the latter complaint.

Dr. Danforth says of Parangi disease that—"It is characterized in its early stages by cutaneous eruptions. They are either squamous, tubercular, vesicular, or pustular, according to the state of the constitution. If the general powers are not much lowered, the eruptions are either tubercular or squamous; when debilitated, they are either vesicular or pustular. Not infrequently all the varieties are met with in the same person at the same time, either the one or the other predominating according to the degree of debility."

My own report gives little information with regard to the character of the eruption in the incipient stage. The cases I saw were those in whom the disease was already developed, and probably enquiry from non-professional persons would have thrown little light on the mode of onset of the disease. I nevertheless regret that I have not paid sufficient attention to this point. There is a statement in my report "that many also complained of pains in the joints, and it was also stated that such pains were often the precursors of the eruption." Dr Tilbury Fox, in his work on "Skin Diseases," while stating that opinions differ as to the nature of Yaws, mentions that "it is said to be an exanthem." He describes the disease as commencing with general debility, languor, and pains resembling rheumatism, and that the eruption then appears first papular then pustular. Dr. Bowerbank says that Yaws has an incubative stage, followed by feverishness and pains about the joints and bones, after which the eruption appears. From other parts of Dr. Gavin Milroy's report, it appears that Yaws occurs once in a lifetime, lasts only for a definite period, and that the sufferer obtains an immunity from it afterwards.

Parangi disease cannot be said to have the features of an exanthematous disease, although slight pains and fever may precede or accompany its appearance. It does not run a definite course, is very intractable to treatment, and a previous attack does not procure exemption from it afterwards.

The difference between Yaws and Parangi disease seems, however, to me to be chiefly in the character of the ulcers in the two diseases.

The strawberry-like excrescences or fungous growths characteristic of Yaws, and which, in fact, have given to it its name, I have not found in any case of Parangi disease. There are elevated scales, but no excrescences from the surface of the ulcers. Dr. Danforth's description corresponds with that given by myself. He says: "Psoriasis is by far the most frequent of these eruptions; it is often associated with fissures of the skin, affecting chiefly the palms of the hands and soles of the feet. The next in frequency are the tubercles; some of them are small, rounded, hard, and elevated above the level of the skin, developing in small circular groups, with healthy skin intervening and forming a round centre to each patch; while others are large, soft, isolated, and little elevated above the surface. These are generally scattered over the whole surface of the body. The vesicular and pustular varieties are not of very common occurrence, and are chiefly found in children of a broken constitution."

I have no doubt that Parangi disease, like Yaws, is often associated with Scabies, Tinea, Impetigo, Ecthyma, and other cutaneous maladies; but I am unable to refer Parangi disease itself to any special class of skin affections. If it were not for the peculiar circumstances under which it occurs, I should look upon the characters of the ulceration as pertaining to Syphilis or Scrofula.

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Another ground of difference between Parangi disease and Yaws appears to me to exist in the affections of bone so commonly met with in the former, and to which little or no reference is made in the description of Yaws Dr. Danforth says: "Besides these affections of the skin, the bones and joints are often diseased. Nodes form on the bones of the head, the forearms and legs; swelling and pain are also complained of in all the large joints; not unfrequently the bones of the metacarpus and metatarsus are affected. The tibia in many cases arches forward. Circumscribed hard, indolent tumors, varying in size from that of a pea to that of an arecanut, often form in the subcutaneous areolar tissue; these are chiefly met with over the ribs, the hip-bones, and in the neighbourhood of joints." In my own report these affections of the bone are alluded to, coupled with remarks on the abuse of mercury.

It appears to me to admit of question whether the nodes, affections of the bones, and rheumatic pains should not be regarded more as the results of injudicious administration of mercury than as the sequences of the disease itself.

A further difference is, in my opinion, to be found in the eminently contagious character of Yaws. Parangi disease, although said to be contagious, has not been found so in places where it does not prevail. Cases admitted into public hospitals in our large towns have not been isolated, and have mixed freely with other patients, and not a single instance has been known in which the disease was contracted by such association. I cannot say what may be the result of direct inoculation, and in the practice of vaccination in this country we are not unmindful of danger from this source. Parangi disease seems rather to be endemic and traceable to hereditary influences, combined with local causes, than to spread from contagion.

Another point of difference, to which perhaps much importance may not be attached, is the presumed origin of the two diseases Yaws is generally believed to be of African origin. Although there were African slaves in Ceylon in the time of the Portuguese and the Dutch, they were not numerous and did not mix with the general population. The tradition of this country derives Parangi disease from the Portuguese, and the name "Parangi," like "Firinge," in India, is to this day applied to persons who are supposed to have descended from the Portuguese. If Parangi disease be syphiloid in its nature, this circumstance is interesting in connection with the history of Syphilis, for that disease came into prominent notice in Europe at the end of the fifteenth century, and the Portuguese obtained a footing in this Island at the commencement of the sixteenth century.

Although I doubt the identity of the two diseases, there are many points of similarity, and the description of Yaws as regards its progress and consequences, and the insanitary conditions under which it prevails would apply in a very striking manner to the disease in this country. The foul ulceration extends over large portions of the surface, and it exists chiefly about the joints, producing contractions and deformities by which the patients become crippled A peculiar cachexia results. The disease is not fatal to life, but the victim drags through a miserable existence, and falls an easy prey to other diseases. Another striking point of agreement is the amenableness of both diseases to mercurial treatment. Many cases of Parangi disease have of late been treated with iodide of potassium with much benefit, but therapeutic means, equally successful with and less objectionable than mercury, remain to be discovered.

In my report I stated my reason for thinking that Parangi disease is syphilitic in its nature; and led by certain views enunciated by Erasmus Wilson in his work on Skin Diseases, I called Parangi disease a variety of *Lepra* or *Psoriasis*. Dr Danforth says: "It is a peculiar form of Syphilis, degenerating into Leprosy." I consider that the disease has no relation whatever to Leprosy (*Elephantiasis Græcorum*) Whether I am right in the belief that Parangi disease is a form of constitutional Syphilis, or whether it is (as many consider Yaws to be) a disease *sui generis*, must be determined by the observation of others who will now have opportunities of watching the natural course of the disease uninfluenced by mercury, and of studying it in its various forms and stages.

Dr. Milroy, writing in February, 1875, to the Under Secretary of State for the Colonies, says:—

I have read with much interest Dr Loos's letter about the Parangi disease of Ceylon, and find that my surmise as to the malady being analogous in various respects to the Yaws of the West Indies, is borne out by Dr. Loos's observation that "there are many points of similarity, and the description of Yaws, as regards its progress and consequences and the insanitary conditions under which it prevails, would apply in a very striking manner to the disease in this country."

As I have been lately preparing a paper upon these two endemic cachexia, which I intend submitting to the Colonial Office, I need not say more at present.

On the 1st of December, 1877, the Colonial Secretary wrote to enquire:—Is Parangi contagious, and how long would the patients, if collected in Galle or any temporary hospital, require to be under treatment?

In reply I reported as follows:—

That this disease has never been considered contagious, as spreading by contact or intercourse with persons affected with it, is proved in our hospitals, where large numbers of persons, with open sores and discharges from them, have been constantly attended to and dressed by hospital attendants, who have never taken the disease by handling the patients

It is the general belief that the disease is propagated by inter-marriages or cohabitation.

The disease, having passed through several generations, has become constitutional, and its effects on the body have, in many cases, all the characteristic features of Syphilis.

Indeed, from time immemorial, it has been regarded in the East as originating from Syphilis, which was introduced by the Portuguese; hence the name "Parangi." which is synonymous with Portuguese. This belief is further strengthened by the fact that mercurials and vegetable remedies, used by the natives in the treatment of Syphilis, have also been applied successfully in the treatment of Parangi. I may also add that under the term several forms of ulceration are included—some specific, and others simple and probably innocent.

With regard to the second of the inquiries—namely, How long would the patients, if collected in the Galle or any temporary hospital, usually require to be under treatment?—I beg to state that the disease, as it prevails at present, does not admit of a radical cure, but only of alleviation. It has been found that patients, who have been benefited by our hospital treatment for periods varying from one to three years, returning to their native villages, the old ulcers have broken out after a time, which makes them apply for re-admission.

I may here state a fact of some interest and importance in connection with the Parangi disease. A Sinhalese doctor, named Silva, who professed to be able to radically cure it, was employed by Government in 1874 at the Galle and Mátara hospitals to effect the professed cure, and a large number of patients was placed under his treatment, but it was found that the remedies he employed, being chiefly mercurials and vegetable powders, though effecting a temporary relief, led to no real recovery from the disease, which broke out in its old forms after the patients were discharged from the hospital. The same results have followed the trials made at Vavuniya-Vilánkulam and Mullaittívu hospitals, which were built with the especial object of curing cases of Parangi.

As far as I can see, the only effectual mode of ultimately eradicating the disease is by ameliorating the condition of the people, by teaching them to adopt hygienic measures, segregation, the use of wholesome and nutritious diet, with a good and pure water-supply, for it is well known that sufferers from Parangi disease live on food of the least nourishing character, while their habits of life are extremely filthy, and their houses of the most wretched description, built on unhealthy sites where all sanitary laws are set at defiance.

I believe these are the only means—namely, by improving the physical condition of each successive generation—by which the disease may very gradually be stamped out.

In July, 1878, the Secretary of State for the Colonies referred an extract from the Medical Report on the Ceylon Hospitals to Dr. Gavin Milroy in the following words:—

The extract refers to the supposed existence in Ceylon of the disease called Yaws, and Sir Michael H. Beach will be glad to receive any suggestions from you with regard to its treatment, should it appear to you to be really the disease of which you have acquired so much experience in the West Indies

In reply, Dr. Milroy says:—

I have the honor to acknowledge your letter of July 25th together with an extract, in original, from the interesting report on hospitals in Ceylon for 1877, and to offer the following observations I return the printed extract, and beg to say that a copy of the entire report would be acceptable to me.

1. The prospect of obtaining by Dr. Kynsey's exertions, an exact distinctive description of the diverse forms of ulcerative disease and skin affections which have been grouped together under the general term "Parangi," will be valued in this country and elsewhere. This work may greatly serve to promote a more accurate diagnosis, than has hitherto been made, of various endemic maladies in different tropical countries I would add, that if a few colored drawings could be had of the more rare and questionable skin diseases, specially of Yaws, they would be very acceptable to the profession

2. I have little or no doubt, in my own mind, that the cases of suspected Yaws in Ceylon, and generally classed together, by the native practitioners, with various other forms of disease, are, if not identical with, analogous and allied in essential character to the genuine Yaws of the West Indies. The absence of the *frambœsoid* fungus, in the cases hitherto observed in Ceylon, may possibly be due to the circumstance that most of the cases were old, chronic, and neglected instances of the malady, such as I saw in Dominica, and in which I found scarcely any examples of the raw-flesh excrescences This feature of the disease has, as doubtless Dr. Kynsey knows, been distinctly recognized in the "Coko" disease of Fiji which is unmistakeably Yaws.

3. With respect to Dr. Kynsey's remark that "it will be strange if the disease is confined to Ceylon, and unknown on the continent of India," the same thought had occurred to me, and I have accordingly drawn the attention of my friend, Dr. Cunningham, Sanitary Commissioner with the Government of India, to this point, in connection with the official investigation on Leprosy now being conducted throughout the Peninsula. Dr. Cunningham would, I am sure, be gratified by learning Dr. Kynsey's observations from himself, as he is much interested in the enquiry that is being carried on under his supervision, and of which the first instalment of the report was published last year in Calcutta

4. As the Secretary of State desires to receive any suggestions with regard to the treatment of the disease, I beg to suggest that a copy of my letter to you, on Dominica, of March 15th, 1878, be sent to Ceylon, as it embraces most of my views respecting the desiderated management of Yaws patients, and Dr. Kynsey will thereby be enabled to judge of the state of things which has served to perpetuate and aggravate the malady in one of the West Indian Colonies.

In 1879, I compiled and issued a scheme for the systematic investigation of the history, nature, and affinities of the disease, and a copy was forwarded to every Medical Officer in the Department, with a register in which all cases of the disease that came under treatment were to be entered. The following is a copy of the scheme which contains, I think, all the points required for enquiring into the disease and for arriving at an accurate diagnosis as to its nature:—

A SCHEME FOR INVESTIGATING THE HISTORY, NATURE, AND AFFINITIES OF PARANGI DISEASE.

I.—*Preliminary Remarks and Object of Enquiry.*

By a careful study of the history, variety of its symptoms from its earliest stages to its termination, and of its etiology, to ascertain, if it can be identified with any affection known to medical

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science, and, if so, to place it in its proper position in our nosology and classification, and discontinue the use of the misleading name by which it is at present recognized in Ceylon.

2. If it is found impossible to identify it with any known disease, it will be necessary to enumerate the diseases with which it is allied, pointing out their resemblances and differences, and then to describe the characteristic and essential symptoms and appearances which will justify its differentiation as a disease *sui generis*.

3. To ascertain its exact topographical distribution and prevalence in the Island, with the two-fold object of affording the best system of treatment for the sufferers, and moving Government to adopt active measures for the prevention, or at least limitation, of this widespread, loathsome, and destructive disease.

II.—*Definition and Description of Disease.*

The term Parangi is constantly used to describe venereal diseases, especially Syphilis; but upon close enquiry it will be found, after separating all such affections and well-known skin diseases, that there is a peculiar malady prevailing extensively in several districts to which the name is also applied

The disease is stated to commence with febrile symptoms and pains in the bones, followed by the appearance of a number of small papules situated upon or beneath the skin; the papules are succeeded by pustules or tubercles The eruption comes out in successive crops on various parts of the body, but especially upon the legs, arms, nates and neighbourhood of the anus, face, around the mouth, and on the sides of the abdomen and chest. The pustules burst and become quickly covered with prominent, dry, yellowish, rupial-like crusts or scabs, upon the removal of which a raw flesh-like surface or ulcer is exposed, frequently raised considerably above the level of the surrounding skin, and furnishing a slight thin purulent discharge. In favourable cases, in young people, and in those with healthy constitutions, this primary stage ends by the scab falling off, and the ulcer or exposed surface healing without leaving any cicatrix, scar, or loss of substance, except in places where the inflammation has been great, and only a permanent dark stain on the skin to mark the site of the eruption. When the disease is neglected or improperly treated, in the old or in persons with enfeebled constitutions, the eruption is followed by extensive secondary ulcerations, often extending deeply, and leading to the loss of fingers or toes, and to permanent contraction when the ulceration heals in the neighbourhood of joints. The cicatrix left after the healing process is completed has a glistening reticulated appearance, lighter in colour than the surrounding skin, but although there is superficial loss of substance, it is seldom considerable in depth.

Dr. Loos thus describes the disease.—*

"Setting aside the cases which may be easily resolved into well-known forms of skin disease met with everywhere, there is an obscure class of skin diseases, intimately allied, and probably having a common origin, prevalent in the interior of Ceylon generally, and more especially in the Vanni To this class I would restrict the term *Parangi* The disease is met with in the maritime parts of the Island, but I am satisfied it is then in a mild and modified form, probably from the aggravating causes not being so fully in operation as they are in the interior. It is met with in both sexes and at all ages: the one sex is not more liable to it than the other, and it is equally common at all periods of life. The eruptions are either pustular or tubercular, less frequently scaly The pustules are small, round, and scattered, with an elevated scab, as in Rupia. The tubercles are at first hard, but afterwards soften and give exit to pus; and the ulcers formed are apt to become sinuous. These frequently run together, and larger ulcers are formed, which are liable to spread. The sores are irregular in shape, in some parts deeper than at other parts, covered more or less with yellowish and dark-coloured crusts; the discharge ichorous, but not copious. I found several persons with ulcers of this kind on the hips and thighs; other parts, however, were also the seats of ulceration. Sometimes the ulcers were found healed in the centre, or were healing in one direction, while they were spreading in another, so that extensive portions of the surface were found cicatrized, while other portions were ulcerated. In children, ulceration was sometimes observed around the lips, and there were many cases of excoriations at the angles of the mouth, sometimes with white discolouration. In one village (Eraperiakulam) a child had a large ulcer on the right nates, excavated, with yellow sloughs; and another child was in a wretched state of emaciation, with several ulcers on the body and ulceration of the nostrils. The eruptions on the children were pustules or tubercles, the summits of which appeared to have a thin mucous lining from which serum exuded, and some had decidedly mucous tubercles (*condylomata*) near the anus In older children and adults, nodes and affections of the bones were common, and obviously connected with the progress of the disease. I met with several young people who had become crippled from this cause and from contraction of the cicatrices of ulcers about the joints. Many also complained of pains in the joints, and it was stated that such pains are often the precursors of the eruptions.

"Pustular eruptions were found in all parts of the body, including the face. The most common seats of ulceration were the hips, knees and elbow-joints; but the dorsum of the foot, the back of the wrist and fingers, fore-arms and legs, were also in many cases ulcerated.

"Such are the characteristics of the disease in its aggravated form—a form which, unfortunately, is not rare in the places I visited. Milder cases exist, in which there are few scattered eruptions or circumscribed patches of ulceration. The general health is remarkably unaffected, and there are no signs of constitutional disturbance or great suffering, except in very severe cases. The disease is not viewed as fatal in itself, and from what I have observed it is troublesome and offensive, but does not materially shorten life, except perhaps in the case of very young children."

* Report on the Depopulation of the Vanni District, Northern Province, by James Loos, M.D, Colonial Surgeon.—Ordered by His Honor the Officer Administering the Government to be printed —Colombo, 1868.

Dr. Danforth thus describes the disease.—*

"Parangi-nasal is the most prevalent disease of the country. With a few exceptions, every one in the district has suffered from it at some period or other of his life. The disease, in my opinion, is a peculiar form of Syphilis, degenerating into Leprosy. It is characterized in its early stages by cutaneous eruptions. They are either squamous, tubercular, vesicular, or pustular, according to the state of the constitution; if the general powers are not much lowered, the eruptions are either tubercular or squamous; when debilitated, they are either vesicular or pustular. Not infrequently all the varieties are met with in the same person at the same time, either the one or the other predominating, according to the degree of debility.

"Psoriasis is by far the most frequent of these eruptions; it is often associated with fissures of the skin, affecting chiefly the palms of the hands and soles of the feet.

"The next in frequency are the tubercules. Some of these are small, rounded, hard, and elevated above the level of the skin, developing in small circular groups with healthy skin intervening and forming a sound centre to each patch; while others are large, soft, isolated, and little elevated above the surface. These are generally scattered over the whole surface of the body.

"The vesicular and pustular varieties are not of very common occurrence, and are chiefly found in children of a broken constitution.

"Besides these affections of the skin, the bones and joints are often diseased. Nodes form on the bones of the head, the fore-arms, and legs; swelling and pain are also complained of in all the large joints. Not infrequently the bones of the metacarpus and metatarsus are affected The tibia in many cases arches forward. Circumscribed, hard, indolent tumors, varying in size from that of a pea to that of an arecanut, often form in the sub-cutaneous areolar tissue; these are chiefly met with over the ribs, the hip bones, and in the neighbourhood of joints.

"As the disease advances ulceration sets in, the ulcers commencing in the cracks and fissures of psoriasis, or in the tubercles, pustules, and vesicles. Not infrequently the ulcers originate in boils of a chronic character. The ulcers in many patients are found in all parts of the body, chiefly on the fore-arms and legs; they are circular with elevated edges, and spread in every direction, destroying deeply the affected parts. The secretion of these ulcers is an unhealthy pus, or a mere watery ichor. Not infrequently the ulcers are irregular and foul, spreading on one side and healing on the other.

"At last symptoms of a formidable character supervene, and all sorts of deformities ensue. The nose, palate, and the cheeks ulcerate; the nodes terminate in caries; the globular tumors soften and break; the fingers and toes mortify; the hands and feet lose their sensibility, and pricking pains are often felt in them; the feet enlarge by the thickening of the tissues, and blebs of various sizes form in them and lead to obstinate ulceration.

"Simultaneous with the local manifestations of the disease, a peculiar cachexy declares itself, and the patient becomes pale and anxious with depression of spirits. The surface of the body acquires a peculiar clayish colour and a glazy appearance; not infrequently it is covered with dry scaly epidermis. The appetite is impaired; the muscular strength greatly diminished; and the circulation grows languid. The patient complains of pains in the limbs and inability for exertion; and is at last left in a state of extreme exhaustion, induced by the weakening discharges, growing debility, and constant pain.

"The disease in some cases is developed in infancy, whilst in others the constitutional tendency to it remains dormant until the age of puberty, very rarely to a later period. Some individuals are more or less affected with it during the most part of a long life without experiencing any great inconvenience from it. Commonly, however, one or more of the distressing symptoms, already enumerated, appear before adult age.

"The disease appears to be as frequent in males as it is in females and not influenced by sex A cold humid atmosphere has a prejudicial influence over the disease, aggravating its existing symptoms; and it assumes a certain degree of malignity during the wet weather. The disease is perpetuated by inter-marriage.

"The disease is hereditary. Not infrequently it is acquired by cohabitation, and it is also said that it is generated in children playing together or partaking food with the diseased. Wounds and ordinary ulcers often assume the character of this disease."

Marshall, in his work on the Medical Topography of Ceylon, enumerates several varieties of Parangi,† and thus describes the disease itself:—

"The eruption made its appearance after febrile symptoms of three or four days' standing. The coming out of the eruption was not immediately followed by a return of health Pains of the limbs, impaired appetite, languor, and a reduction of strength continues for some time. For the most part the eruption appeared first on the face: generally, however, it eventually extended over the body. The protuberances were most numerous on the face, in the axilla and groins Sometimes after an attack of fever, a fresh eruption occurred before the preceding one had entirely disappeared The eruption in some cases was remarkably protuberant. For the most part the protuberances were circular, from a quarter to a third of an inch in diameter, smooth, and in general they were flattened on the top. After the lapse of an indefinite period, the cuticle which covered the protuberances burst, a glairy fluid then oozed from the ruptured spot, which by drying formed an elevated gray-coloured scab Some of the large scabs covered spongy granular excrescences."

* Administration Report of the Principal Civil Medical Officer and Inspector-General of Hospitals for 1872

† Notes on the Medical Topography of the interior of Ceylon, by Henry Marshall, Surgeon to the Forces.—London, 1821.

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The varieties are,—

Alu parangi (අළුපරංගි)	Dada parangi (දද පරංගි)
Odí parangi (ඔඩිපරංගි)	Geta parangi (ගෙටපරංගි)
Goni parangi (ගොනිපරංගි)	Aramana-wana parangi (අරමනවනපරංගි)
Kushta parangi (කුෂ්ඨපරංගි)	

Besides these there are several terms in use amongst the people and vedaralas, such as Dumas (දුම්), a disease of the feet, Pínasrógé (පිනස්රෝගය), Etapalárógé (ඇටපලාරෝගය), and Panukewilla (පනුකැවිල්ල), often used for the after-effects of Parangi, which it is very desirable to have accurately defined and described. It is evident from the descriptions given of the disease, especially by the native vedaralas, that several probably distinct affections have been included under the term, and, as regards its nature, that it is supposed to be either syphilitic, a form of Leprosy or Lupus, or a disease *sui generis*.

In paragraph V. will be found a few remarks on the three named diseases which may be useful in arriving at an opinion, but it is to be distinctly understood that the object specially aimed at by this enquiry is a collection of *facts* from the different districts of the Island where the disease prevails.

III.—*Instructions for the Systematic Investigation of the Disease.*

Give the past and present history of the case

1. Obtain a history of the case, and note the present condition of the patient as regards general health, diathesis, temperament, age, sex, race, occupation or mode of life, past history of patient, and of eruption.

Mode of onset and period of incubation

2 Ascertain the mode of onset of the disease, the duration of the latent or incubative stage, if there is any, the early constitutional symptoms, and if they precede, accompany, or follow the eruption.

Constitutional symptoms.

Can the symptoms of the disease be divided into distinct stages? If so, the duration of each, and total duration of the disease.

Investigate the subjective symptoms.

3. Subjective symptoms. Note if there is any itching, burning or tingling sensation complained of, and observe any marks of scratching which may be present, and if it is auto-inoculable.

Examine all parts of the body where any eruption is present

Observe the exact locality affected, and distribution of eruption.

4. Carefully examine every part of the body where there is any eruption; note the order in which the several parts became affected, and if previous to the appearance of the eruption there was any scratch, sore or abrasion, or if the skin was unbroken The condition of each patch of eruption should be noted at the time of making the examination. Observe if the eruptions follow the course of any particular nerve, if the area of the disease is diffused or circumscribed, and if there is any marked difference in the size of the patches of eruption Describe the shape or form of the patches

Ascertain the earliest appearance of the eruption as described by the patient or actually observed by yourself, its progress, and if there is only one single evolution, or if it comes out in successive crops For minute examination select those portions of the skin where the disease is least complicated, and compare the sound portions of the skin with the diseased.

Separate the eruption into its component parts, distinguish the essential from the superadded

Distinguish what is essential in the eruption from that which is non-essential or accidental, what belongs to the original affection from what has been superadded * Did the eruption originate from contagion or spontaneously?

Termination of eruption.

Description of the ulcers

5 Describe the ulcers which form after the appearance of the eruption. Their most frequent situation, and number, size, consistence, colour, shape, secretion or discharge (if any), crust, and the surface after its removal, and whether the exposed part is sensitive or not, if elevated or depressed in relation to the surrounding parts, its edges, areola if any, and the progress of the sore from the first to its healed condition. If the crust falls off, is it replaced?

If you find ulcers upon any part of the body originating independently of the eruption, describe them.

General condition of skin

6 Describe the general condition of the skin. Is the eruption preceded, accompanied, or followed by any peculiar state of the cuticular surface of the body? Is it unusually dry or moist? Examine the mucous membrane of the mouth and throat.

Determine the tissues involved.

7 Determine as early as possible the original anatomical seat of the disease and then the extent to which the neighbouring tissues are involved; note, if possible, the exact extent to which each element of the skin is affected, and whether the disease is confined to the cuticle, true skin, hairs, sebaceous glands, follicles, or to alterations in the pigmentary layer only, or if all are involved in the disease—

† (*a*) Condition of epidermis.	(*d*) Beard and hair
(*b*) Follicles	(*e*) Colour—any divergence from the normal.
(*c*) True skin.	

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* Modifications in skin diseases are brought about by remedies, diathesis, chronicity, scratching, abortive development, and by the intermingling or co-existence of two or more different diseases (*Fox*), to which may be added food and climate.

† (*a*) The epidermis may be rough, dry, scaly or thickened by the accumulation of ephithelium as in Psoriasis, abnormally thin or transparent, or the outer layer may be raised by the formation of vesicles or pustules.

(*b*) The orifices of the follicles may be plugged with sebum as in comedones, or may pour out an abnormal quantity of oily matter; papules may be present formed from the hair follicles or by enlargement of papillæ of skin.

(*c*) The true skin may be infiltrated, which is ascertained better by sense of touch than by sight.

(*d*) The beard and hair may be either removed too easily or too brittle; force required for removal should be noted, and an examination under microscope made of shaft and root with and without Liq. Potassæ.

(*e*) Colour Any divergence from the normal may be due to altered degree of vascularity, hemorrhage, irregular pigmentation, jaundice.

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8. To arrive at a correct diagnosis, first take a general view of the eruption as a whole, irrespective of the elementary or secondary forms,* then take cognizance of those separate parts which combined form the disease.—(*Liveing.*)

Most cutaneous diseases are inflammatory in their origin (plastic or catarrhal), the first stage or that of congestion being followed by the escape of fluid from the vessels which, if plastic, forms solid elevations or papules, serous forming vesicles, or pus giving rise to pustules —(*Fox*)

Carefully separate the phenomena of the disease into primary or eruptive, secondary or ulcerative, and sequelæ, which latter enumerate and describe in the order of their observed frequency.

By a careful study of Parangi, ascertain if there are any morbid conditions of the constitution co-existing with the disease, such as Syphilis, Leprosy, Scrofula or Lupus, or if any peculiar cachexia accompanies it

Finally, decide the class of disease to wh ch you can refer it

Is it a general disease or merely an affection of the skin? Is it an acute specific disease or parasitic, or a syphilide, or a non-specific exanthem, or does it run its course attended with exudation, or hemorrhage, or with a deficiency, excess, or mal-distribution of pigment; or is it an affection of the hair follicles, sebaceous glands; or does it consist in destruction of tissue, or hypertrophy or a neurosis, or is it a form of gangrenous inflammation?

Microscopical examination.

9. If you have the means at your disposal, make a microscopical examination of the discharge from the ulcers and of the blood, recording anything peculiar.

10 In case of death record the post-mortem appearances

IV.—*Instructions for Medical Officers in drawing up a Report on the Parangi Disease in their Districts*

1. The names of the villages infected in your district, with the population† of each, and the number of cases,‡ approximative, if the actual number cannot be given.

2 Is the disease among the inhabitants?

(*a*) Persistent—*i e.*, always existing?

(*b*) Is it liable to increase, decrease, or disappear? If so, to what causes do you attribute these alterations? At present is it decreasing or increasing? Are there sporadic outbreaks? Is the disease ever epidemic? Have you noticed any disproportion in the number of males and females in your district, or in the number of children to a family? Average number of children to a family?

3 Is the disease hereditary?

Have you ever seen a congenital case?

4 Etiology.

Give the local, personal, predisposing, and exciting causes of the disease

Describe:—

(*a*) The state of the dwellings.

(*b*) Personal habits.

(*c*) Nature of food, water supply, &c

5 Is it contagious or non-contagious?

(*a*) Is it communicable by direct contact with the sick? Is it auto-inoculable by scratching?

(*b*) By the clothes they have recently worn?

(*c*) Can it be communicated by sexual intercourse?

(*d*) Can it be spread by a recent arrival in a district which was previously free from it?

(*e*) Have you known any case where the disease has spread among the patients in a hospital ward owing to the admission of a person suffering from the disease?

(*f*) Have any of the hospital attendants ever contracted the disease from patients suffering from Parangi?

(*g*) Can a child communicate the disease to the breast of the mother when sucking?—

(*a*) when the skin is unbroken;

(*b*) when there is a fissure

(*h*) Can the disease be communicated by inoculation to the lower animals

6 Can Parangi be communicated in any other way than by direct contact of the virus?

(*a*) Is it necessary to have a sore or abrasion?

(*b*) Can it be communicated when the skin is unbroken?

(*c*) Can the disease arise spontaneously?

7. Does the disease run a definite course, and what is its ordinary duration?

8. Will it attack well-fed and half-starved persons alike, if both are equally exposed to the same conditions?

(*a*) Have you known a case to occur among persons living in comfort and habits of personal cleanliness?

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* The elementary forms or primary lesions are red patches, papules, tubercles, maculæ or spots, vesicles, bullæ or blebs, pustules, wheals or pomphi, petechiæ, vibices, and echchymoses. The secondary lesions are excoriations, fissures, chaps or rhagades, scabs or crusts, ulcers, scars or cicatrices. "These varying phenomena are brought about by the anatomical structure of the skin and are of uncertain value in determining the nature of the inflammation."—*Fox.*

† From last Census.

‡ Return to be furnished by Headmen according to annexed form

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9. Can a person be attacked with the disease more than once in a lifetime?

(a) Is it liable to recur?

10. Have your traced any connection with reference to the origin of the disease and the intermarriage of near relations?

11 Have you found the eruption to exist in connection with disease of any organ?

12. What influence has the disease on the health and longevity of those attacked?

13. Have you known an instance where a patient was attacked with Syphilis, who had previously suffered from Parangi, and *vice versâ*?

14. Is inoculation ever practiced by the people for its prevention or cure, or for any other purpose?

15. What treatment have you found most effectual?

(a) Medicinal, internal and external.

(b) Dietetic and hygienic.

16. Is it amenable to treatment or curable?

(a) In its early primary or eruptive stage?

(b) In its secondary manifestations or sequelæ.

17. Is the disease frequently treated by the vedaralas in your district? By what name is it known, and what are the varieties described by native practitioners?

18. What prophylactic measures could you recommend to prevent outbreaks of the disease or to stamp it out or limit its extension when it has occurred?

19. Do you consider enforced or compulsory segregation and isolation of the sick are necessary to prevent the spread of the disease?

Nature of the disease.

20. Is Parangi, in your opinion, a distinct disease *sui generis*, or is it merely a variety or modified form of syphilitic, leprous, or some cachectic disease?

21. Have you any evidence to shew that the disease has been aggravated by improper treatment, especially by the abuse of mercury?

22. Is the course of the disease modified or altered in any way by the occurrence of other affections? Are the course of vaccinia, small-pox, or chicken-pox modified by the co-existence in the same individual of Parangi? If so, how? What influence has the disease on pregnancy and parturition?

V.—In investigating a Case with reference to its Origin or Affinities

(1) Syphilis

(a) *In the very young*, a family history of Syphilis; the general aspect is marasmic, with a shrivelled old man-like appearance, the skin is dirty, muddy-like, and it has lost its elasticity, and hangs in loose folds; it is dry, often exfoliating and erythematous about the buttocks, cry is harsh and cracked with characteristic snuffles, mucous tubercles about the anus and mouth, ulcerations of mucous surfaces, a high arched palate, inflammation of the thymus gland, various eruptions over the body, also about the feet and hands, subacute onychia; somewhat later, the condition of teeth is very peculiar, the two upper central incisors are atrophied, peg-like, and present towards their free edge a uniform or cordate character, the notch occupying the centre of this edge. Interstitial Keratitis is developed, and enlargement of the lower end of the humerus between the epiphysis and shaft

(b) *In the adult.*

1. History of syphilitic inoculation, presence of cicatrices, indurations, scars, and stains about the penis and groin, ulcerated sore-throat, nocturnal pains, substernal tenderness.

2. Colour of eruptions is reddish—yellow-brown or dull-red becoming coppery.

3. Form circular, horse shoe or gyrate with thick crusts, greenish or black, and firmly adherent or serpiginous.

4. Ulcers: surface is ashy-grey covered with a pultaceous substance.

5. Cicatrices are whitish and reticulated.

6. Fissures are common.

7. There is generally absence of pain and itching.

8. Polymorphism of eruptions or the existence of different kinds of eruptions on one and the same individual. Dermato-syphilis may be present in no less than five or six different forms of eruption.

9. If a female, probably a history of miscarriages.

10. The tertiary symptoms are characterized by—

(a) The formation of gummata, depending on a specific over-growth of tissue.

(b) Their great inveteracy and tendency to recur.

(c) Involvement of internal organs.

(d) Their want of symmetry.

(2) Leprosy is a specific disease characterised by the slow development of nodular growths in connection with the skin, mucous membranes, and nerves, and where the latter are principally involved by the supervention of anæsthesia, paralysis, and a tendency to ulcerative destruction and gangrene There are two forms, the anæsthetic and tubercular; the specific phenomena are livid blotches appearing here and there on the skin-remaining out from a few days to a few weeks, then disappearing, to be succeeded by similar outbreaks; they are tender, elevated discs or rings, irregular in shape and varying in size from half-an-inch to two or three inches in diameter; they are followed by brownish pigmentary stains or unnatural whiteness. In the tubercular form hard resistent nodular elevations develop in the cutis and appear as nodulated, thickening of the eye-brows,

adjacent parts of forehead and lobes of ears; when the nodules ulcerate and afterwards heal, the cicatrices produced are deep and dense; frequently there is a peculiar cough and hoarseness of the voice developed, which are very characteristic.

In the anæsthetic form there may be no tubercular formation, but the sensory and motor nerves become affected, followed by muscular paralysis and wasting, bullæ form, burst and heal, leaving depressed cicatrices behind Gangrene occurs in the hands and feet, beginning either from within, outwards, or the reverse, and ending in the loss of fingers or toes or even of the hand or foot.

The morbid process consists in the infiltration of the affected tissues with innumerable small cells containing comparatively large nuclei.

(3) Lupus consists in a specific overgrowth of the cutis, of chronic progress, and resulting in the formation of indelible cicatrices or in more or less extensive destruction of tissue.

It commences with congestion followed by hypertrophy of a limited area, and the formation of solitary or grouped lenticular tubercles, a line or two in diameter; they may become covered with adherent scales or with thick crusts, or the tubercles become pale, depressed, and contracted, and assume a cicatricial character, or extensive ulceration occurs with considerable destruction of parts; but there is very little complaint of suffering on the part of the patient.

The morbid process consists in the development of a kind of tissue composed of small cells imbedded in a fibrous material.

VI.—Treatment recommended in Hospital

1. A warm bath on admission, the skin to be well washed with soap.
2. A tepid bath daily.
3. The ulcers to be dressed with carbolic acid ointment or oil (1 to 20).
4. The internal use of iodide of potassium with decoction of sarsaparilla, followed by a course of cod liver oil and iodide of iron.
5. Nutritious food

The Government granted a sum of 500 rupees for the purpose of obtaining a series of illustrations of the several forms of disease included under the term Parangi.

I have been fortunate in obtaining the services of an able local artist in Mr. J. K. L. Vandort, who has furnished me with an atlas of faithful, life-sized pictures in water-colours, in illustration of the cases detailed by the Medical Officers who were good enough to take an interest in the investigation. Many of the illustrations were taken under my own directions from patients that I had personally inspected.

I am sorry to say I have not been favoured with many reports throwing light upon the subject; however, I have pleasure in drawing attention to the careful report of the District of Kurunégala and the detail of cases furnished by Assistant Colonial Surgeon Mr. T. F. Garvin, M.B., who has taken much interest in the subject, and who is well-qualified to continue the special investigation of the disease, should it be considered desirable to do so.

The report of Mr. J. Attygalla, M.B., is also worthy of remark; he is a Sinhalese medical officer well acquainted with the manners, habits, and customs of his countrymen.

The following questions were required to be answered in each case in filling in the register:—

1. Name, age, sex, race, occupation or condition.
2. Birthplace and residence.
3. Date of attack, duration of disease previous to admission, physical condition on admission
4. Is it a first or second attack?
5. Form of disease—
   (*a*) Primary.
   (*b*) Secondary.
   (*c*) Sequelæ (variety.)
6. Any other members of family affected; if so, how many? Name the order in which they were attacked.
7. How did the disease commence: any scratch or sore on body previous to its appearance?
8. Do many people in village or district suffer from a similar disease; if so, about how many?
9. To what cause is the disease attributed?
10. Ever suffered from any form of venereal? Name the form.
11. Vaccinated or not; did disease appear before or after vaccination?
12. Ordinary food, in ounces, if possible.
13. Ordinary food of people.
14. Treatment previous to admission. Was mercury given or not?
15. Description of case, following the instruction, and giving briefly the history, symptoms, diagnosis, prognosis, etiology, pathology, treatment, and result

On examination of the registers, 241 cases were recorded, and the results arrived at will be found in the table given after the special report on the disease, and preceding the cases which have been drawn up in connection with the illustrations.

In 1879, I endeavoured to obtain statistics of the number of cases of disease existing in the several Provinces of the Island included under the popular name Parangi. I

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caused a paper to be circulated through the Government Agents and their Assistants, and the subjoined figures give the result obtained :—

Total number of cases in Province.		Males.	Females	Race.		
				Sinhalese.	Tamils.	Moors.
WESTERN PROVINCE ...	360 ...	255	105	356	4	...
NORTH-WESTERN PROVINCE ...	711 ...	423	288	670	18	23
CENTRAL PROVINCE ...	573 ...	396	177	549	4	20
NORTH-CENTRAL PROVINCE ...	294 ...	167	127	209	29	56
NORTHERN PROVINCE ...	489 ...	279	210	28	442	19
EASTERN PROVINCE ...	1,120 ...	674	446	137	716	267
SOUTHERN PROVINCE ...	6,758 ...	4,265	2,493	6,750	..	8
Total ...	10,305 ...	6,459	3,846	8,699	1,213	393

I also annex the following table giving the number of cases treated in the several hospitals of the Island from the first year I find the disease mentioned in the Hospital Returns—1873 to 1880, inclusive :—

	1873.		1874.		1875.		1876.		1877.		1878.		1879.	
	Treated.	Died	Treated.	Died.	Treated	Died.	Treated.	Died.	Treated	Died.	Treated	Died.	Treated.	Died.
General Hospital, Colombo ...	—	—	—	-	—	—	—	—	—	—	—	—	2	—
Civil Hospital, Pánaduré ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Do. Kalutara ...	—	—	—	—	—	—	—	—	—	—	1		5	—
Do. Kégalla	—	—	—	—	—	—	5	—	4	—	6	—	11	—
Do. Ratnapura ..	—	—	—	—	—	—	—	—	—	—	3	—	2	—
Do. Negombo ...	—	—	—	—	—	—	—	—		—	86	—	24	—
Do. Kurunégala .	—	—	—	—	—	—	—	—	108	—	95	—	173	—
Do Puttalam ...	—	—	—	—	—	—	207	—	68	—	41	1	69	2
Do. Chilaw ..	—	—	—	—	—	—	95	—	51	—	6	—	27	—
Do. Galle ...	—	—	91	1	—	—	70	1	8	—	10	—	28	—
Do. Matara ...	—	-	—	—	—	—	—	—	87	1	138	1	106	—
Do. Hambantota	—	—	—	—	—	—	—	—	—	—	—	—	3	—
Do Tangalla ...	—	—	—	—	—	—	—	—	26	—	40	—	21	—
Do. Trincomalee	4	—	—	—	—	—	10	—		—	7	—	68	1
Do Batticaloa	—	—	—	—	—	—	30	—	—	—	—	—	—	—
Do. Mullaittivu .	—	—	—	—	—	—	331	3	174		179	1	206	—
Do. Vavuniya-Viláp-kulam ...	—	—	—	—	—	—	—	—	146	2	129	1	153	1
Do. Point Pedro ...	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Do. Kandy .	—	—	21	1	—	—	—	—	—	—	—	—	9	—
Do Gampola ...	—	—	—	—	—	—	—	—		—	—	—	1	—
Do. Badulla .	—	—	—	—	—	—	—	-	—	—	2	—	—	—
Do. Matale ..		—	—	—	—	—	-	—	—	—	-	—	4	—
Do. Nuwara Eliya ...	—	—	-	—	—	—	—	—	—	—	—	—	—	—
Leper Asylum, Hendala ...	—	—	—	—	—	—	2	—	8	1	—	—	2	—
Immigrant Hospital, Dambulla	—	—	66	—	204	—	303	—	143	-	97	—	111	1
Do Anurádhapura	—	—	52	—	92	9	41	—	137	3	144	1	53	—
Do Mihintale .	—	—	114	2	236	3	184	5	138	2	452	4	114	—
Do. Mannar ...	—	—	4	—	5	—	13	1	1	—	—	—	4	—
Do. Vankalai and Pesalai ...	—		—	—	—	—	1	—	—	—	—	—	—	—
Do Puliadi-irakam	—	—	-	—	—	—	—	—	—	—	—	—	—	—

PARANGI DISEASE.

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Far more reliance should be placed, in estimating the amount of disease existing, upon the annexed extracts from the reports of the Government Agents and their Assistants, and some of the Colonial Surgeons, which have appeared in the Administration Reports since 1867; but in reading them, it should be borne in mind, as I have previously stated, that several diseases are included under the term.

EXTRACT from a letter of the Government Agent of the Northern Province, Mr. W. C. Twynam, in reply to an application for statistics.

From your letter No. 14 of the 6th instant it appears that you require the information asked for by you for the purpose of drawing up a report regarding the prevalence of Parangi and Leprosy in the several Provinces of the Island, to be forwarded to the Right Hon. the Secretary of State for the Colonies.

I know from experience that it is impossible to get anything like reliable information regarding these diseases from the headmen Many of them would not know the difference between Parangi and Leprosy: others would look on any other disease as Leprosy, and report accordingly; whilst others would take little or no trouble about the matter, and merely make a report. In any case, it would take some months for the headmen to go round and get the names of all persons suffering from Parangi and Leprosy.

Parangi disease prevails, as I have reported, to a fearful extent in the Province, especially in the Vanni District.

I first brought the matter under the notice of Government in 1864, in my Administration Report for that year, as Assistant Agent of Mannár. I referred to that report in my report to the Irrigation Commission in 1867, and Dr. Loos was, in 1868, ordered to visit the Vanni Districts, and enquire into the nature and causes of the Parangi disease, and the extent to which it prevailed.

I accompanied Dr. Loos in his circuit through the Mannár Vanni, and it is in reference to what fell under my observation then that I feel convinced that it would be impossible to obtain reliable information from the headmen in regard to the prevalence of Parangi and Leprosy, and that any report based on returns furnished by them would afford a very erroneous impression of the real condition of the people in connection with these diseases.

Dr Loos had made inspection of some villages before I joined him, and I was astonished to find that in three large villages in which I knew that almost all the inhabitants were affected with Parangi, he had only received returns of three and four in each village as suffering from the disease. On the villagers being all turned out for inspection, however, he found that from one-half to three-fourths of them were suffering from the disease or its effects.

The hospitals at Vavuṇiya-Viláṇkuḷam and Mullaittivu were created by Government especially for the treatment of the Parangi disease on the recommendation of Dr. Loos. Dr. Danforth was placed in charge of the Vavuṇiya-Viláṇkuḷam hospital, and made two or three reports, I believe, to Government regarding the Parangi disease.

I still adhere to what I have before reported, namely, that there is scarcely a man, woman, or child in the Vanni Districts of the Province, who has not had the disease, who is not suffering from it now, or is about to have it. I have not, to the best of my recollection, seen one inhabitant of the Vanni who has been entirely free of it.

It prevails to some extent in the maritime pattus of the Mannar and Mullativú Districts, in the Pachchilaippalli, Tenmaradchi and Vadamaradchi divisions of the Jaffna District, and there are traces of it in the other divisions of the Jaffna District; and I believe that if anything like an accurate return could be obtained of the number suffering from the disease or from its effects, it would be found that fully 40,000 of the inhabitants of the Northern Province were, in one way or another, affected by it.

If, after what I have stated, you still wish to obtain returns from the headmen in the printed forms sent by you, I beg you will furnish me with 500 forms in Tamil, this being a Tamil district.

I shall be most happy to afford or obtain for you any information in my power regarding these diseases, or to render any assistance to any of your officers who may be deputed by you to enquire into and report on them

In 1867, Mr. W. C. Macready, Assistant Government Agent at Puttalam, says on the subject of Parangi :—*

The population is thinly scattered over the country, and the people are indigent and, as a rule, unhealthy, suffering not a little from ague and fever and other ailments incidental to their poor mode of living. Among these, Parangi, commonly called Spanish-pox, which is so rife in the Vanni, is here often fatally prevalent, checking increase of population and propagating disease and misery. It is seldom that a family will be found in this pattu where the number of the children exceed two or three Want of wholesome food and sufficient quantity of it, with their almost universal dependence on kurakkan for subsistence (a diet unhealthy and debilitating when long persisted in), the scarcity of wells to supply fresh and untainted water in the annual seasons of drought, the total absence of ventilation in their dwellings, and their dirty clothing and dirtier habits, are some of the causes which unite to render them unusually susceptible of disease Every Demala-pattu Kandyan is especially liable to contagion from his personal uncleanliness. His under-clothing is hardly ever washed; the same old dirty cloth does duty under all circumstances, even under a newly-washed outer garment. He seldom, if ever, has two changes of raiment at one time. The pillow he places under his head has no cover, and is never washed. I have seen the women scraping the dirt off it with a knife. The mat he lies upon is brown with dirt. It is hardly strange that contagious diseases should be bred and fostered among so much filth

Again, their partiality to kurakkan as a food in preference to rice is remarkable. I believe the principal reasons for this are the absence of any tax upon the cultivation, the ease with which

* Administration Reports, 1867.

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the cakes are prepared, and the length of time they can be preserved. These cakes are much more portable than boiled rice, and easier carried to the chenas where the men and boys spend much of their days. They are used in the form of a biscuit, the flour being kneaded up with water, with the addition of a little salt and green chilly, and baked for five or six minutes.

Parangi is, I believe, under certain conditions, contagious, but not, as far as I can discover, an infectious disease. Its effects thoroughly resemble those of Syphilis, but it appears to be generally believed that its origin is not venereal, though venereal sores when neglected are said to degenerate into Parangi. I have seen small children from three to four years of age affected by it. The native remedies in this district are a yam called "Alabehet," and a free use of mercury, which usually effects a cure at the risk of ruining the patient's constitution. I have not seen any medical papers upon the subject, which, I think, is one well worthy the attention of the Medical Department.

The Government Agent of the Southern Province, in 1867, (Mr. W. Morris) writes :—*

There is perhaps no part of the Island in which rice forms so little the staple of food for the inhabitants as the Galle District: its place is supplied by yams, sweet potatoes, jack, and bread-fruit, with fish. Yet, as the rule, the people are strong and able-bodied, though, unfortunately, a large proportion of them are more or less affected with that loathsome disease known as Spanish-pox, the spread of which has of late been attributable to inoculation by the Government vaccinators.

It is only from last year we have any reliable statistics of the death-rates; and that of the Galle District, as appearing in the annexed memorandum, is remarkably small although it labors under the disadvantage of notoriously bad water in the most populous parts of the district, to which has been attributed the disease known as the "Galle leg" or Elephantiasis.

Until last year I had no conception of the mass of disease existing in this district. Whilst travelling, one not unfrequently meets a wretched-looking object sitting by the wayside begging, and in the towns they seem to congregate. During last year, consequent on the large number of defaulters under the Road Ordinance, from whom nothing could be recovered, I fixed days at some of the principal villages to exempt such persons as were unfit for labour. The result was, that I was beset with men of all ages afflicted with horrible sores—some lepers, but the majority, more or less affected with what is commonly known as the Spanish-pox. The unaffected seem not to fear contagion; like scrofula, I believe there is no doubt but that the disease is hereditary, and where such numbers are affected, it must, from natural intercourse, be on the increase, and is most probably conveyed to healthy subjects through the medium of vaccination. I recollect in the Seven-kóralés, the great objection to vaccination was the bad sores which there frequently followed the operation, though the vaccinators attributed them to the patients tampering with the pustules, to prevent the proper effect of vaccination developing itself.

The question has recently been mastered in England, whether vaccination has not brought greater evil in its train than the one for which it was supposed to be a specific, by the propagation of consumption, scrofula, and syphilitic affections. If so in England, the case must be infinitely worse in Ceylon, where the vaccinators are for the most part mere machines, with just sufficient knowledge to be able to report that the pustule produced has all the appearance of genuine cow-pox and without a care or thought of the constitution of the person from whose arm the lymph is taken, or to whom it is transferred; the number of persons operated on being the great test of their fitness for the office of vaccinator.

The Assistant Government Agent of the Hambantota District, in 1867, (Mr. Thomas Steele) says :—*

While treating on the subject of health, it may be of interest to record here a circumstance connected with vaccination that has, I am told, been observed in the district. It appears that a constitutional cutaneous disorder, which is transmissible hereditarily, known as Spanish-pox, and called by the Sinhalese the *Feringhee disease*, is common among the natives, and it is found that in vaccinating healthy subjects, lymph, if taken from persons affected with the above disorder, has the unhappy effect of disseminating it. It is said that many families, at one time perfectly free from the disorder in question, have, through the extension of vaccination, suffered in this way; and if this be true, the matter demands full and searching inquiry at the hands of the medical authorities. Should the statement be founded on fact, it will be necessary to adopt the most stringent precautions in using only fresh and pure lymph. It is worth while to inquire whether anything similar has been observed by the profession in Europe.

The Assistant Government Agent of the Mannár District, in 1868, (Mr. E. N. Atherton) says :—†

The increase of that malignant disease, Spanish-pox, is a source of regret to those who have watched its progress for years past. The extreme poverty of the people and their uncleanly habits have no doubt helped to spread it, but I trust that active steps will be taken by the Government to render medical aid to the infected villages, with the view of eradicating this scourge.

The Assistant Government Agent of the Mannár District, in 1870, (Mr. P. A. Templer) says :—‡

The other cause of depression to which I have alluded is that notorious, but little understood disease, which is generally named "Paranki Nasal" or Spanish-pox. There is scarcely an individual, and certainly not a family, in the Vanni-pattus, untainted by this filthy disorder, and the only remedy which is ever applied by the native physicians is almost as hurtful as the disease itself. I mean large doses of mercury. This disease is not only antagonistic to the welfare of the people

* Administration Reports, 1867. † Administration Reports, 1868.
‡ Administration Reports, 1870.

in its direct influence upon their physical powers, but is the main obstacle to a removal of that other evil to which I have referred, viz., the want of a population to till the soil. I do not consider that the present state of things is at all beyond hope of amelioration. The establishment of hospitals and the improvement of the water-supply will go far towards restoring the district to the state of prosperity which it seems to have enjoyed under Dutch rule. There are, however, some limitations within which only one is justified in expecting any benefit to accrue from either hospitals or irrigation. With regard to the former, nothing will be so successful as success. I mean that the hospitals will entail an utter waste of the money expended in building them, if an efficient medical man is not found to take charge of them. When first the hospital is open, no doubt patients will be found ready and willing to submit themselves to treatment, but if the treatment is not successful, the people will lose confidence, and the hospital will have to be abandoned. I therefore earnestly hope that a physician with experience and some professional attainments will be placed in charge of the hospital now in course of erection at Vavuniya-Vilákkulam when it is first opened. It will not be necessary to make his appointment a permanent one; he might remain long enough to ensure a successful inauguration of the scheme, and when he has collected round him a staff of men from among the native medical practitioners, who will have studied the disease and its treatment under the eye of one whose success has been beyond question, he can leave them to work by themselves, subject only to an occasional visit of inspection. I have no doubt that such a master and such pupils might easily be found, if a fit inducement to go and live in Vavuniya-Vilákkulam were offered, but I have equally little doubt that, unless such an arrangement as I have hinted at is carried out, the scheme will be an absolute failure.

In contemplating any proposal for increasing the water supply of this district, the peculiar circumstances of the people and their total want of capital must be borne in mind. The Sinhalese have been—and with great reason—called apathetic. But the most torpid of them presents a picture of restless energy, when compared with a Vanni Tamil, whom it is almost impossible to convince that his ancestors had some few wants left unsatisfied, which, if he will stir himself a little, can now be provided for. What was enough for his father is enough for him, and no spontaneous act of his will advance him one inch upon the pathway of cultivation. Much of this can of course be accounted for by the almost universal incidence of that disease to which I have elsewhere alluded.

It is hardly to be expected that a man borne down by a loathsome syphilitic disorder will do much more than consent to exist till disease kills him, and the man of the Vanni does just this, and no more. Admitting, then, that these people will not help themselves, the question is, are they to be left in their present state till disease exterminates them and want of population makes a wilderness of the district? or, are improvements to be forced upon them, in as palatable a form as can be devised? Surely, the latter.

The Government Agent, Northern Province, in 1871, (Mr. W. C Twynam) says :—*

"Whatever may be said of the peninsula of Jaffna, the same cannot be said of the mainland districts. The Mannár district is certainly not prosperous. On the contrary, its condition is one demanding serious attention with reference to the introduction of some measure to check, if possible, the decay so rapidly going on The repeated outbreaks of cholera, introduced by immigrant coolies, have told fearfully on the population, and the existence of a loathsome disease which produces much misery and suffering, must tend to check any natural increase of the population to make up the ravages caused by epidemics, or even by ordinary causes.

The Anurádhapura and Vanni districts have also suffered from the effects of epidemics, and in both the same loathsome disease prevails They cannot therefore be said to be prosperous They are certainly not progressing, and, if not actually receding like Mannár, are merely holding their ground.

What I have before stated also, as to the prevalence of that loathsome Vanni disease and its effects in checking the increase of population, is, curiously enough, borne out by the returns of the Census I once before represented, when alluding to this disease, that it prevailed in the Tenmaradchi and Pachchilaippali divisions of the Jaffna peninsula. Now, it is in these very divisions of the peninsula that there is either a decrease shewn in the population or a very slight increase It is in the eastern villages of the Tenmaradchi division and in the Pachchilaippali that the disease begins to make itself apparent to a person going towards the Karaichchi and Vanni from Jaffna, and I have seen some dreadful cases of it in the Vadamarádchi when holding exemption meetings under the Thoroughfare Ordinance

The following is the extract from the report I refer to; viz, the annual report of 1864 :—

"A matter to which I think it my duty to invite serious attention is the gradual depopulation of the district, especially of the Vanni pattus The people themselves attribute this to the periodical outbreaks of sickness introduced by the immigrant coolies

"There is no doubt that the immigration from the coast has been, on the whole, and was more especially at the commencement, a most serious evil to the district, but there exists amongst the natives themselves a terrible disease, hitherto supposed to be of a syphilitic nature, from which *no man, woman or child in the Vanni seems to be entirely free*, and which would, I believe, *of itself*, have led, though more slowly, to the same result.

"The disease is by no means confined to this district I have, however, never seen such dreadful instances of it as have come under my observation during the last two circuits in the Vanni, nor was I aware till lately how tainted the whole population of the Vanni are with it.

"I have seen traces of it in the Hambantota district. It prevails to a great extent in the Tenmarádchi and Pachchilaippali divisions of Jaffna, and is also as bad in the Mullaittívu District as in this.

"Mr. Northmore reported its existence, and the ravages caused by it in the Anurádhapura District, when Assistant Agent there, and called the special attention of Government to the

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Administration Reports, 1871.

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subject; and I have been lately informed that a medical gentleman residing in Batticaloa, and who has been many years in the Island, made a representation to the Government on the subject, and recommended enquiry being made into the cause and nature of the disease, in order to the discovery, if possible, of some remedy for it. In the interest, therefore, of a very great portion of the Island, it appears to me that the matter calls for the most serious consideration of Government.

"As regards the Jaffna district, in general, there has no doubt been an increase of population, but I believe that very exaggerated notions have been formed by people visiting the peninsula, of the population of the peninsula from what they have seen in the neighbourhood of the town and some of the parts and along the main lines of roads. There are, however, large tracts of country which are uninhabited, being mere salt marshes, and in the Pachchilaippali, in which are the cocoanut estates, the population is very scattered."

The Acting Assistant Government Agent, Anurádhapura, for 1871, (Mr. T. W. Rhys David) says :—*

The health of the people has been, on the whole, very good, the principal disease being fever—a disease much more fatal here (and possibly also in the Vanni) than the Spanish-pox or congenital venereal, usually called "Parangi" The latter seems to attack nearly every child here, much as measles or chicken-pox do at home, and with results not much more injurious. If it attacks adults, however, the disease is not so easily shaken off, and the great immorality of the people must lead to a high average of primary syphilitic disease.

The Assistant Government Agent of the Mannár District in 1871, (Mr. P. A. Templer) says :—*

The district has been free from epidemics for so many consecutive years now, that perhaps the population is really on the increase (though of course only slightly); but this does not alter my opinion, that the district will never be prosperous until the "Paranki Nasal" has been eradicated. Everything has been done by Government towards a fair experiment being made; and it only remains for the revenue officer in charge of the District and medical officers in charge of the hospitals, to give the people such encouragement as shall make the failure of the experiment (if it does fail) a convincing one. If, however, the scheme is hampered by considerations as to whether patients are in a position and willing to guarantee the payment of whatever is expended by Government on their cure, I am quite certain that the people will turn away from the hospital in disgust, and the scheme will fall through. Until the doctors have had time to do their best, and until a sufficient number of patients have been persuaded to submit themselves to treatment, any impediment to free entrance into hospital will only make certain the failure of an experiment which has already cost the Government a considerable sum. If, on the other hand, the efforts of the medical men are successful after a time, I am sure that the people will flock to the hospital, and those who can will willingly pay for being cured. At present they don't believe that they will be cured, and will only go to hospital under pressure; so that, to ask such people what security they have to offer that the expenses incurred on their account will be repaid, is to shut the hospital door in the patient's face.

The Assistant Government Agent of the Mullaittivu District in 1871 (Mr. G. H. Withers) says :—*

"The great and too-well known curse of the country is the disease which enfeebles generation after generation, but this it is hoped will be softened or subdued in process of time by medical treatment; I cannot think this disease is fostered or exacerbated by poor and bad living so much as is generally supposed

"In ordinary years, the people are fairly off for food. Besides paddy, varied with kurakkan and vegetables, occasionally there is a constant supply of game In one of three households there is a gun, and the owner's savings or loans are spent in powder and lead The meat is eaten fresh, or salted and preserved. Fish, and not flesh, is enjoyed by the inhabitants of the maritime pattus Bad water in parts of the district has doubtless bad effects on the general health. But what I cannot help thinking goes far more to debilitate the system than the quality or quantity of the food consumed, is the exposure during the season of cultivation to the great vicissitudes of temperature in the twenty-four hours, which at night in the thickly-wooded interior is rendered intensely cold to the senses by the heavy fall of dew No less an evil than the exposure is its ally, mercury, the favourite remedy for the Vanni disease, which is taken in enormous doses."

The Acting Government Agent of the North-Western Province, for 1871, (Mr. W. D. Wright) says :—*

In a country which, at some fifty miles from the sea, does not attain a greater altitude than 200 feet, the climate is necessarily warm, and as there is but little intervening hill-country to check the winds which sweep over it in either monsoon, it appears to me that the endemic fever which exists at all seasons of the year, but especially during and after the rains of the north-east monsoon, may be attributed to miasmatic vapours generated in the jungle wastes of the Northern and Eastern Provinces and wafted hither

The effect of this malignant fever are but too apparent in the emaciated and also dropsical forms of the village population, and it is to them as well as to that fearful scourge—Parangi—that may be described the desolate wretchedness of a part of the Province which forms a portion of the Vanni Neither disease can be said to be actually fatal to life except in such fever cases where the brain becomes affected, but they both prostrate the sufferers and have been the main cause of

* Administration Reports, 1871.

the rack and ruin around us. No doubt too, unwholesome diet, bad water, and contagion in the case of Parangi combine towards the prejudicial effects of both diseases; and any efforts of the Government for the amelioration of the people and revivification of impoverished and sparsely-populated villages should be undertaken in a very liberal spirit. But such efforts should not be overlaid with pecuniary requirements of repayment, as in the Irrigation Ordinance, which (excellent as a scheme, provided the water-rate of 2*s*. an acre be not exceeded in districts to which it is suitable) seems inexpedient when applied to places where every endeavour should be made to retain the small resident population and induce more to abide.

When reading, a few years ago, Dr. Loos's report about Parangi, I do not remember having seen any notice of a means of preventing the sad consequences of the disease by a species of inoculation, and will therefore describe the practice in the remote parts of the Vanni District. It is to make children, when they are about one year old, partake of rice off a leaf or plate on which a person suffering from the disease has eaten. In a short time, pustules, like itch, appear on the child's body, and then medicines containing minute quantities of mercury are administered, which cause the pustules to dry up, and in seven days the scales to fall off, leaving deep dark marks which in course of time disappear It is said that this is an almost certain prophylactic, and that, though the disease may attack one who has been so guarded, the effects are never serious. I believe that Dr. Loos animadverted upon the use of mercury, and no doubt the vedarálas, from ignorance of its results, are not careful enough in prescribing it, but the cure for this seems to me to be an increase of the means whereby people may obtain efficient medical aid As the case stands, the best known remedy for the disease is mercury in combination with China root, and as it is said that unless the disease be cured within three years, no remedy is efficacious, what surprise can be felt at the poor unsophisticated sufferers adopting a course of known potency while they are ignorant that it will probably lead to a life of almost equal wretchedness as that from which they would fain escape?

The Assistant Government Agent (Mr. E. N. Atherton) on the Sabaragamuwa District for 1872 says:—

Traces of the Parangi have appeared at Walalgoda, Embilipitiya, and Tunkeme. I have reason to believe that it is chiefly owing to the use of diseased grains The poisonous nature of the spurred rye or maize is well known in Europe, and has given rise to epidemic diseases at various times. Those who eat it were seized with gangrene in some part or another, some losing their fingers, others their hands or nose.

The symptoms in both cases closely resemble each other. First preceded with low fever, inflammation and excessive pain, then the parts suppurate and fall of. It attacks persons of all ages and both sexes, some in the upper and others in the lower extremities. I have even seen sucking babes affected with this fearful scourge.

Considering the extent to which Spanish-pox exists in the northern portion of the Island, I would suggest the propriety of engaging the services of an experienced medical officer, to trace out the cause and source of this disease, which is depopulating whole villages

The Assistant Government Agent (Mr. H. Hay Cameron) on the Nuwarakaláwiya District for 1872 says:—

Into this hermetically-sealed abode of men no faintest breath of air can creep The rain drips from the mouldy thatch to stagnate in the gutter beneath; the plantain leaf rots when it falls before the door, and the borders of the little tank in which the people wash, and from which they take their water for cooking and for drinking, form the public latrine of the village Is it a subject of amazement then, that Parangi, fever, and rheumatism rage unchecked throughout the country? It is here that Nuwarakaláwiya must own and submit to the ill-sounding titles which she bears.

The Assistant Government Agent (Mr. Reginald C. Pole) on the Puttalam District for 1872 says:—

The health of the inhabitants of the district was generally good. No disease, either epidemic or endemic, prevailed, unless that type of disease peculiar to the Wanni and commonly known as Parangi-rógé may be said to be endemic in the Demala-pattu During the second quarter of the year a low kind of fever was very prevalent in the southern pattus In my season report for that quarter I find it recorded

The Principal Civil Medical Officer and Inspector-General of Hospitals for 1872 (Dr. W. P. Charsley) says:—

Extraordinary efforts were made during this year, at the special request of His Excellency the Governor, to afford medical aid to those suffering from what is termed Parangi disease. Without entering into a discussion here as to the true nature of this complaint, it is well known to be highly prevalent in the Vanni and large portions of the low parts of the interior of the Island, and so fatal are its effects among the inhabitants of these regions that the natural increase of population is not only checked, but in some parts it is said to decimate the people.

A highly intelligent and efficient medical officer was selected for this purpose; and he was stationed at Vavuṇiya-Viláṇkuḷam, where there is a small but convenient immigrant hospital. Assistant Colonial Surgeon Dr. Danforth took charge of this station from 4th June, and has since then continued with unabated energy to diffuse the benefits of European medical treatment among the inhabitants of the Vanni.

I have much pleasure in inviting attention to Dr. Danforth's interesting and able report on the disease, as it met his observation, and on the result of his treatment. From 4th June to the end of the year, 431 cases came forward for treatment, of which 31 were treated in hospital. Dr. Danforth very properly does not aspire to have absolutely cured any, but fifty were discharged much improved, 191 improved in a less degree, but the result of 162 cases was unknown from

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their not returning to the dispensary. The majority of the patients were Tamils—368; only 88 were Sinhalese and 25 Moors. No doubt that some benefit has been derived by these laudable efforts to combat the disease in its very stronghold, but, when it is considered how widely it is diffused among the inhabitants of the low-country and the great number of years through which it has been gradually gaining upon the people, I do not anticipate that efforts of this kind will, or can, be attended with permanent good results. Dr. Danforth has indicated in his report the true remedies for this dreadful malady, which are to be found in well-assorted marriages, the means of procuring better food and better clothing, the opening up of roads and market places among the people, increased cultivation of soil which would tend to disperse the malaria, under the influences of which they pass their lives, improved dwellings and good drinking water. Medical treatment is a mere adjunct, and may give relief to those suffering, but it will not eradicate the disease. The only true remedy is a complete reversal of all those conditions which have led to its existence, and can be effected only by slow degrees.

Dr. C. A. Kriekenbeek, Colonial Surgeon of Jaffna, in 1872 says :—

At all three of these hospitals* the disease called "Parangi," prevalent in most parts of Ceylon, but particularly in the Vanni District, is extensively treated and with evident marked success. The medical officers of these three stations vie with each other in the skill and care with which the miserable objects, the sufferers from this loathsome disease, are treated by them, and the establishment of these hospitals is doubtless the greatest boon that could be conferred by an enlightened and liberal Government upon the inhabitants of these districts

Dr. P. D. Anthonisz, Colonial Surgeon, Galle, in 1873, says:—†

The next disease with which a large portion of the people are affected in Mátara, Taṇgalla and Hambantoṭa Districts, is an affection which destroys or disorganizes nearly every structure of the body, from the skin inwards to the bone. It has in all its appearances and ravages the sequelæ of Syphilis, transmitted from parent to offspring, and the disease is so communicable or transferable that few are seen in Taṇgalla and Hambantoṭa districts of pure Sinhalese, who have escaped it. Some of those who have recovered are literally marked with scars all over the body, the result of destructive and diffused ulceration. The disease is commonly known as "Parangi." From observation, and conversation with adults who have had it, and quite recovered from it, I find that they invariably allow it to run its course, which in a good constitution with tolerably good food and alterative remedies is likely to effect a cure; but those who are not blessed with a good constitution, of which the majority are, succumb to the effects of it, and drag out a miserable existence after having by a painful process lost the use of either a portion of the upper or lower extremities, the face disfigured by the destruction of the nose, lips, &c., and large callous ulcers left open by loss of great portions of the integument. Objects of this nature are not uncommon in Mátara, and when to constitutions of this kind, an impoverished diet is added, the effect is more easily conceived than described. The disease deserves the notice of Government with the view of adopting such measures as will tend to lessen human misery, to prevent the mutilation of bodies, to render men capable of labour, and thereby not be a burden to the community.

Dr. C. A. Kriekenbeek, Colonial Surgeon of the Northern Province, for the year 1875 says :—

Parangi Disease.—Dr. Danforth gives the following table of cases treated :—

	Indoor.		Out-Door.		Total.
Remained on 31st December, 1874	17	...	—	...	17
Since admitted	255	...	207	...	462
Total ...	272	...	207	...	479
Discharged much improved	263	...	25	...	288
Discharged improved	2	...	50	...	52
Result unknown	—	...	132	...	132
Died ...	1	...	—	...	1
Remaining on 31st December, 1875	6	..	—	...	6

It will be seen from these statistics that the benefits of the European system in treatment of this loathsome disease are widely appreciated and largely availed of The following statement of Dr Danforth is not, however, quite reassuring : "Several have returned relapsed, but such cases have been frequent among the poorest classes"

I do not know if I am to accept this statement as accounting for the large number treated. But, if treatment in hospital has the effect merely of affording temporary relief to the sufferers with the prospect sure and certain of the disease breaking out again on their return to their old habits of life, the conclusion is irresistible, either that they have left hospital too soon and before radical cure could be effected, or that a change in their habits and modes of life must take place before any appreciable degree of success can be realized in stamping the disease out. This is a change which only the lapse of time can bring about, and it is satisfactory to notice the improvements in the condition of the inhabitants, which are slowly, but surely, taking place under the rule of the present Governor of Ceylon.

Mr. W. C. Ondaatjie, Colonial Surgeon, Western and North-Western Provinces, for the year 1875 says :—

I should not omit to mention a striking feature in connection with the patients treated in the hospitals of Negombo, Chilaw, Puttaḷam, and Kurunégala, namely, that the majority are sufferers

* Anurádhapura, Mullaittívu and Vavuṇiya-Vilánkulam.

† Letter addressed to the Principal Civil Medical Officer and Inspector-General of Hospitals.

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from Parangi disease, who, it would appear, are attracted to our hospitals from the different villages. I have no doubt these hospitals tend largely to the alleviation of the sufferings of people afflicted with this loathsome disease, which is one of the chief causes of depopulation. The Government has therefore conferred a great benefit on the people by the erection of Parangi wards.

It is satisfactory to observe the steady increase in the number of patients availing themselves of gratuitous medical aid at the various dispensaries attached to the Government hospitals.

In 1877, I reported as follows :—

I have paid much attention to the subject of the disease known as "Parangi" to the natives whenever I had an opportunity of inspecting cases in those districts where it prevails.

The disease is supposed to be endemic in and peculiar to Ceylon, and the name has been, I believe, applied by the vedarálas or native quacks of the Island since the time of the Portuguese. The word is a corruption of "ferengi" and simply means foreign—implying, I presume, that the disease is due to importation by strangers coming to the Island, and communicating it to the fixed inhabitants

I have no doubt that a large number of different forms of disease, specifically distinct in their nature, have been included under the term, and that in many districts every form of ulceration, simple or specific, is included, and that many common skin diseases are likewise put down under the name "Parangi."

I have myself, even in the civil hospitals, recognised the following diseases included under that name : Lupus and lupoid ulcerations, rodent ulcer, syphilitic ulcerations, cases of hereditary Syphilis, and scrofulous ulcerations. I am far from wishing it to be understood that I consider *all* cases of the peculiar disease which has received the name can be included under the headings, but I believe there is no disease in this Island peculiar to it or that cannot be included under one of the names known to medical science.

My own opinion, formed after a full consideration of the question and an acquaintance with all that has been written on the subject, inclines me to the view that the disease hitherto considered peculiar to, and by some even thought confined to Ceylon, is nothing more than Framboesia or the Yaws of the West Indies, or a disease very nearly allied to it .

The literature of Parangi is by no means extensive the name is not mentioned in the early medical works of the Siṇhalese. Dr. Marshall, in his Medical Topography of Ceylon, mentions it, and describes a variety of forms which were known to the vedarálas Dr Loos, when Colonial Surgeon of the Northern Province, wrote an able paper on "The Depopulation of the Vanni," which he attributes in part to this disease ; and the late Dr. Danforth also contributed a paper on Parangi, which he termed the "Vanni Plague." The papers of Drs Loos and Danforth were published by order of the Governor and presented to the Legislative Council.

Dr. Gavin Milroy contributed a couple of papers bearing on this subject to the *Medical Times* and *Gazette*, and he also wrote through the Colonial Office a reply to the paper of Dr. Loos, in which he points out the apparent similarity between Parangi and Yaws.

To those interested in this subject, I beg to offer the exhaustive report of Dr. Gavin Milroy on Leprosy and Yaws in the West Indies.

The head-quarters of the disease will be found at Mullaittívu, Vavuṇiya-Vilánkuḷam, Kurunégala, Puttaḷam, Chilaw, and Negombo. I have also seen characteristic cases in the hospital at Galle with the peculiar crusts very well marked. I have not been able to meet with the very early cases, but in those patients that I examined the distinguishing characteristic was the elevated rupia-like crusts with condylomata in the angles of the mouth and around the anus in cases where there was not the slightest evidence of Syphilis.

When the crusts fall off and after the ulcers heal, the dark stains on the skin are invariably found, but in the few cases I have seen there was not, as far as I could discover, any raspberry-like fungus beneath. Perhaps I saw the cases at too late a stage.

It will be instructive to ascertain if the peculiar scars, contraction of joints, and acquired deformities so frequently seen in our hospitals, are the after-effects of Yaws.

Many of the symptoms of Parangi (Yaws ?) are common with other diseases—Syphilis, Scrofula, Elephantiasis, and Leprosy—and hence arose the confusion in classification and in the views held as to its nature ; some saying it was syphilitic, others that it was a form of Leprosy, and a third that it was a combination of the two.

I have interested several of the officers of the Department in this subject, and I hope after some further enquiries to return to it again.

In the meantime, I would suggest that a small sum of money be voted (say 500 rupees) for the purpose of procuring drawings of different phases of the disease to illustrate a report which I am preparing for the information of Government, and for transmission home.

Dr. P. D. Anthonisz, Colonial Surgeon, Southern Province, for the year 1877 says :—

The disease known under this head is one that disables, disfigures, and impoverishes a large portion of the inhabitants of Mátara, Taṇgalla, Hambantoṭa, and some portions of the Galle District. It is a malady that deserves the attention of the authorities of the country, and no measures which have the semblance of doing good will eradicate it or benefit the population The disease, by its name, shews that it has been introduced into the country by European conquerors, and it was known for a long time as the Spanish-pox, just as in England the specific disease was known by the name of French-pox. This disease, as well as many of the eruptions and ulcers in different parts of India, has so close a connection with the eruptions of specific diseases that the greatest authority on diseases of the skin, Professor Hebra of Vienna, seems to think that they all must have a specific origin. This malady is looked upon by the natives of the country as a highly contagious one, and as far as my knowledge goes, I have seen the children of healthy European parents affected with it by mixing and playing with native children in villages where the disease existed. The permanent cures that are effected among the natives who suffer from the disease

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are generally of those who come into town from distant villages and enter the hospital until they are so far relieved as to enable them to beg their food from door to door and to sleep in the open verandahs of houses. Boys and lads who arrive from distant villages looking disfigured and covered with ulcers and eruptions, in the course of two or three years have so far recovered that no trace of the disease is visible Even the grown-up who have come to town with large ulcers and contraction of joints make such good recoveries after a time, as to be able to go out and employ themselves as labourers and porters.

The Assistant Government Agent (Mr. P. A. Templer) on the Puttalam District for the year 1878 says :—

The subject of the health of the people cannot, however, be dismissed without a reference being made to that loathsome and cruel scourge, Parangi. In my Administration Report for 1877 I did not touch on this subject, as I felt that I did not know enough of the district to be able to discuss it fairly, but I have now been two and a-half years in charge of the Puttalam District, and have been more than once through the whole of it, especially the Demala-hatpattu where the disease is most prevalent. A return asked for by the Inspector-General of Hospitals of all cases in every division of the district is now in course of preparation by the headmen, and until it comes in I will not enter upon the statistical aspect of the question. But no one who has gone through the villages in the interior will deny that the disease has assumed proportions which call for thoughtful and vigorous action on the part of those who are responsible for the well-being of the people. It is in the opinion of some medical men, I believe, that the disease is quite curable. Whether it is so in adults upon whom it has taken a firm hold, and whose constitution has been thoroughly weakened, may be open to doubt, but surely among children, who are as much its victims as are adults, an early and patient application of approved remedies would have a beneficial effect. I have on several occasions had children brought in from the villages to the hospital, but it is impossible to persuade them to remain among strangers and far from their homes. It is the same with adult cases, and if anything is to be done in the way of medical treatment the hospitals must be brought nearer to the homes of the people. In the southern part of the district, where there are many cases of Parangi, some of which come from Kurunégala side of the boundary, Mr. Soysa's hospital at Maravila may be near enough, but in the Demala-hatpattu it is out of the question to expect the people to avail themselves of the Puttalam hospital, twenty or thirty miles from their villages.

I think that an effort should be made to induce the people of each hatpattu in the Province to construct a substantial but temporary hospital for themselves, the timber being given to them free of royalty ; and when this has been done, the Government should provide the medical officer. An assistant might be placed in charge of each hospital, all the hospitals in the Province being then placed under the supervision of one experienced medical officer, who would visit each in turn.

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CONSIDERABLE confusion exists in the use of the term "Parangi;" several distinct diseases are evidently included in the descriptions given by the vedarálas, or native quacks of the Island, and by others who have written on the subject.

2. The term is a corruption of Farangi; the Sinhalese language having no "f," "p" is used instead. The Portuguese, who were the first foreigners who settled in the Island, were known and are still spoken of as Feringees. The Parangi disease simply means the disease of foreigners or strangers, and indicates the importation of certainly one disease, if not more, about the time the Portuguese took possession of Ceylon.

3. In Ribeyro's history* the disease is mentioned thus :—"The Neapolitan disease which the natives call Parangileḍe or Portuguese sickness, since the Portuguese first introduced it into the country, is not easily cured."

4. There is little doubt the word was restricted to Syphilis, which was first introduced into Asia in the sixteenth century, soon after its epidemic-like outbreak in Italy when the army of Charles VIII. was besieging Naples.

5. Previous to the sixteenth century Syphilis was, I believe, unknown in India. The old Hindu writers described various maladies of the genital organs; but they were unacquainted with venereal disease, and there is no name for it in the Sanskrit language. In modern Sanskrit works it is called "Faringa Róga" or Portuguese disease.†

6. The Sinhalese never possessed original works on medicine,‡ all their knowledge being derived from Sanskrit works written in India in ancient times. The earliest mention of Parangi occurs in the Yóga-Ratnákaré, a book containing the whole native system of medicine, composed in verse in the 12th year of the reign of Bhuwaneka Báhu the 7th, who reigned at Kóṭṭe about the year 1548 A D., and about 43 years after the landing of the Portuguese in Ceylon. The mention of Parangi occurs after diseases of the skin, of which descriptions are given, but only prescriptions for what the author calls Parangi sores. The chief ingredient is mercury, and it is significant that China-root, which is so largely used at the present day for this disease, is not alluded to. The use of the drug was not known at the time the book in question was written, but was subsequently introduced by the Portuguese, to whom its utility in Syphilis is said to have been made known by Chinese traders at Goa.

7. Marshall, in his Medical Topography of Ceylon,§ says: "Parangi-leḍé seems to have been originally intended to denominate a new disease, and, from the similarity of the sound and other collateral circumstances, it may perhaps be inferred that the term meant Portuguese. There is, however, no tradition among the Kandyans respecting the importation of a disease; and the priests assert that Parangi-leḍé is mentioned in the books which were written during the last incarnation of Buddha." "The assertions of the Kandyans," he adds, "in regard to the antiquity of their medical compositions, do not merit our confidence."

8. With reference to the remark that he was informed by native vedarálas that the disease called Parangi-leḍé was mentioned even in their most ancient books, I caused reference to be made to all the books of any authority used by the vedarálas, whether brought from India or written in the Island, and am informed no allusion whatever to such a disease can be found, with the exception of the Yóga-Ratnákaré, as I have previously stated.

9. He also asks :—"Is it not likely that Parangi-leḍé was primarily intended to specify the venereal diseases? This supposition is not unattended with difficulty. The books which treat of Parangi, I am informed, do not ascribe the disease to impure contact. It is rarely, almost never, alluded to as a consequence of ulcers on the genitals. Some of the vedarálas have an obscure notion that Parangi, particularly that variety of the disease called *Oḍḍi Parangi*, occasionally follows ulcers on the penis. None of them, however, profess to be able to distinguish the ulcer which is likely to be followed by a variety of Parangi from that which is not succeeded by this disease. The Kandyan vedarálas do not in the early stage exhibit mercury for the cure of ulcers on the genitals. Many of them assert that they never knew ulcers in the throat or affections of the bones follow either running or ulcers on the penis. Some, however, state that they have seen these symptoms succeed ulcers on the penis."

* "History of Ceylon, presented by Captain John Ribeyro to the King of Portugal, 1685." Translated by Geo. Lee.

† In the Bhávaprakáso, a work on Hindu Medicine, by Bhava Misra, written some three hundred years ago, Syphilis is stated to have been introduced by the Portuguese, and is called "Pharinga Róga."

‡ A list of works on medicine in use amongst the Sinhalese will be found in the Appendix.

§ "Notes on the Medical Topography of the interior of Ceylon, &c., &c., with brief remarks on the Prevailing Diseases." By Henry Marshall, Surgeon to the Forces.—London: 1821.

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10. Again he says :—*" There is a complaint mentioned in the Kandyan medical works called Parangi-ledé (Parangi disease). Sometimes the disease is designated by the term *rata maha ledé*—'a foreign virulent disease.' The Parangi disease is divided into seven varieties, namely : —

(1.) Alu (ash) Parangi—an ash-colored desquamating state of the cuticle.
(2.) Oddi Parangi—large ulcers covered with flattened crusts and scabs.
(3.) Custita Parangi - Numerous ulcerated pimples on the skin.
(4.) Góní Parangi •An unequal thickened state of the skin, resembling the skin of an elephant, or it is rough like a gunny bag, with ulcers on some parts of the body.
(5.) Dada Parangi--Great itchiness of the skin, which when scratched breaks out in large ulcers that are generally covered with thick crust or scab.
(6.) Geta Parangi (or knotty)—Pains in the joints followed by bumps or tumours which afterwards burst and form ulcers.
(7.) Aramana Parangi.—Tubercular ulcerations on various parts of the body; sometimes several of the ulcerated tubercles unite, and form a large excrescence.

The above arrangement has the appearance of some discrimination; it is chiefly, however, in appearance. The vedarálas (native doctors) often greatly confound the different varieties.

11 In the absence of any mention of Parangi in any of the native works, a list of which is given in the Appendix, I am inclined to think that the names of the different varieties of Parangi referred to by Marshall were popular terms in use among the natives to distinguish the different forms of disease included under the term. If they were mentioned in any books, they were some *wattórs* or prescription books possessed by some of the native vedarálas, in some instances with short descriptions of diseases for their guidance. These are not books of any authority, but only detail the prescriptions used by different vedarálas; and as the practice of medicine is often continued in the same family for several generations, they are handed down from one to another with such additions as those deemed necessary by the experience of each vedarála, and are jealously guarded from outsiders having any access to them.

It is said that many such books exist among the vedarálas, especially in the Kandyan districts; and endeavours are being made to obtain access to some of them, to find out whether the different varieties of Parangi mentioned by Marshall are mentioned or not.†

12. The following remarks of Marshall,‡ in his Medical Topography, are very suggestive, as shewing the difficulty of diagnosing the secondary symptoms of Syphilis from the eruption of Parangi, and as giving a good description of the latter disease :—

"Constitutional symptoms are, by some vedarálas, said occasionally to follow ulcers on the penis The secondary affections mentioned are papular, scabby eruptions on the skin, copper-coloured spots and blotches, ulcers in the throat, painful tumours on the shin-bones, and an enlargement of some of the joints. These symptoms receive the inexplicit denomination of *Parangi-ledé*: the primary ulcers do not obtain this appellation.

"The vedarálas state likewise that eruptions and blotches appear on the skins of children and adults, who have not had primary ulcers, exactly similar to the eruptions and blotches which sometimes follow ulcers on the genitals. They do not pretend to be able to assign a specific difference between them, and no distinction is made in the plan of cure.

"In regard to tumours on the bones and swellings of joints, the most learned of vedarálas whom I have seen says that he considers these as aggravated symptoms of the equivocal disease called *Parangi-ledé*; and as the symptoms which obtain this appellation occur without primary sores, he

* Op. cit., p 43 *et seq*

† I have since obtained a translation of the varieties of Parangi given in the Veda Pota, a medical work written by Don Siman Tilakaratna, of Mátara, 1787, A.D:—

1. *Parangi lede* පරංගිලෙඩ.—Parangi disease.
   Rasu una.— tyalism and other effects produced by mercury.
1. *Parangi wane.* පරංගිවණේ —Parangi ulcer.
   A. *Neranawané.* නෙරනවණේ.- Protruding ulcer.
   B. *Pádu wane* පාඩුවණේ.—Washing ulcer. (Aramane wane of Marshall ?)
2. *Parangi rujá.* පරංගිරුජා — Parangi pains
3. *Geta Parangi.* ගැටපරංගි —Knotty Parangi.
4 *Loku dada wana.* ලොකුදද වණ — Dada Parangi, a form of Parangi resembling a kind of skin disease called *dada*
5. *Oddi rata maha Parangi.* ඔඩ්ඩිරටමහපරංගි —The signification of this term is obscure. The literal meaning of it so far as I can understand is, "The great Parangi of the Oddi rata" (coast country.)
6. *Parangi sori* පරංගිසොරි —Parangi itch. (Kusta Parangi of Marshall.)
7. *Pup nerima.* පුප්නෙරිම —This is the same as *Dumas*, but a more expressive term, in that it means the protrusion of the fleshy-like granulations, a characteristic feature in this form of the disease
8. *Paya pelima.* පයපෙලිම—Cracking of the soles of the feet.

The last mentioned forms of the disease *Pup nerima* and *Paya pelima* are said to appear as sequelæ some time after the disease had occurred.

‡ Op. cit, pp. 69, 70.

therefore believes that nodes and enlarged joints appear unconnected with sores on the penis occasioned by sexual contact.

* * *

"Enlargements of the bones, or ulcers in the throat, are, I believe, very rare consequences of ulcers on the penis, in the Kandyan country; I have not seen a single case labouring under any of these constitutional affections. Several cases of a cuticular eruption, denominated *Parangi-ledé*, have come under my observation. They almost all resembled the "tubercular eruption of syphilitic appearance," described by Dr. Bateman in the 5th volume of the Medico-Chirurgical Transactions.

"The eruptions sometimes occurred during the existence of ulcers on the penis, and sometimes after they had healed. In one case it appeared in a young boy, who had never had connection with a female. The patients in general stated that the eruption made its appearance after febrile symptoms of three or four days standing. The coming out of the eruptions was not immediately followed by a return of health. Pains of the limbs, impaired appetite, languor, and a reduction of strength, continued for some time For the most part, the eruption appeared first on the face; generally, however, it eventually extended over the body. The protuberances were most numerous on the face, and, next to the face, in the axillæ and groins sometimes. After an attack of fever a fresh eruption occurred before the preceding one had entirely disappeared. The eruption, in some cases, was remarkably protuberant. For the most part the protuberances were circular, from a-quarter to a-third of an inch in diameter, smooth, and in general they were flattened on the top. After the lapse of an indefinite period, the cuticle which covered the protuberances burst: a glairy fluid then oozed from the ruptured spot, which, by drying, formed an elevated grey-coloured scab Some of the large scabs covered spongy granular excrescences The protuberances did not in any case show a disposition to ulcerate.

"The eruption was remarkably uniform in almost all the cases; still, however, there was some variety in its appearances The circular abrupt rim or edge of the protuberant spots was more conspicuous in some cases than in others. No oozing of glairy fluid took place in several instances, and consequently there was no scabbing.

"In one case, the eruption and general symptoms of impaired health resisted the continued use of a great variety of vegetable decoctions, prescribed by a vedarála, for three months. At the end of this period the blue pill was given, which produced ptyalism in about four days. After the lapse of about a week the protuberances had all disappeared; health returned rapidly.

Several other cases of this kind of eruption were cured by slightly affecting the mouth for only a few days. In three cases which came under my eye, the eruption disappeared without medicine. The spontaneous recoveries were, however, more tardy than when mercury was exhibited."

13. Allowing that the term "Parangi" was at first restricted to Syphilis, and that it now includes a number of distinct diseases, it will here be stated the names of those which have been identified. They are principally—

(*a*) Syphilitic diseases in all stages and forms.
(*b*) Framboesia or Yaws, or a disease closely allied to it, to which the term "Parangi," if retained, should be restricted.
(*c*) Lupus.
(*d*) Ordinary scrofulous ulcerations with enlargement of glands.
(*e*) Common forms of skin disease.

14. Marshall gives the following account of Aramana Parangi, and no one reading it can doubt the identity of the disease he describes and Lupus, which is very common in all parts of the Island.*

"I have seen a number of Kandyans suffering under a widespread ulceration of the skin. In the Sinhalese language this complaint is called "aramana-wané." The disease occurs on all parts of the body, except perhaps the hairy scalp The outer circle of the ulcerous surface extends while not unfrequently the central area is healing; occasionally while some of the ulcers are healing, other parts of the skin become affected and eventually ulcerate. Commonly the skin ulceration has a round shape; sometimes it is oval, occasionally it has no determined figure, and spreads over a large surface. The ulcers have never callous or elevated edges; in appearance they resemble phagedenic sores. The discharge from the ulcerated surface is generally a colourless, glairy fluid, which by drying forms an elevated hard grey scab. The cicatrices are generally well defined. Each cicatrix is covered with a smooth shining cuticle For the most part they are flat, but sometimes they are elevated and wrinkled, resembling the skin of a dried raisin This disease occasionally commits great ravages on the face. The forehead, cheeks and lips are much liable to it The nose and eyelids, however, suffer more from an extension of the ulceration than perhaps any other parts of the body Sometimes the alæ of the nose become tubercular and ulcerate, more frequently they are destroyed by the progressive ulceration which extends along the floor of the nostrils and destroys the velum pendulum palati. Superficially the ulceration creeps up to the lower eyelids, which are frequently destroyed, and occasionally the sight of the eye is lost Sometimes the lower eyelids are everted from the cicatrization of the ulcerous surface on the cheeks. In one case, which came under my observation, the lips were so far united as hardly to admit the passage of a finger into the mouth.

"Aramana-wané rarely affects the bones, except the thin bones of the nose; sometimes it extends over one or more joints, which become anchylosed, probably in a great degree from long want of motion. The disease prevails more among the poorer classes than among the wealthy

* Op. cit., page 41.

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The latter are not, however, entirely exempted from it." Further on he states :—"The Kandyans seem to consider this complaint as nearly incurable. Under the use of simples, the ulcers occasionally heal up ; often, however, only for a short time ; a permanent recovery seems to be hardly ever expected." "I have seen," he adds, "eight or ten cases treated with blue pill, which was given so as slightly to affect the mouth. The symptoms were universally improved ; indeed, all those who took the medicine regularly recovered. How far the cures may be permanent, I am unable to say."

15. Next in frequency to syphilitic affections comes Frambœsia or Yaws, or a disease to which the term Parangi should be restricted ; but it is difficult to obtain characteristic cases of the disease in its early stages, although its later manifestations or sequelæ are met with in nearly every hospital of the colony.

16. If, to explain the origin of this disease in Ceylon, it is necessary to call in the aid of importation, there will be little difficulty in indicating how it may have been introduced ; and, if it was imported in the way here mentioned, it will serve to explain the cause of its being included under the term Parangi, and the reason why so much confusion has hitherto existed in describing the disease, and why by some Parangi is considered syphilitic, and by others non-syphilitic.

17. The Portuguese, and again the Dutch, were accompanied by a large number of negroes from Africa, and it is possible they may have introduced Yaws or Parangi in addition to Syphilis.

18. Against this hypothesis, it must be borne in mind that Parangi is least prevalent in those parts of the Island which were occupied by the Portuguese, whilst it prevails in places where till very recently few Europeans ever penetrated, and with which there was little or no communication with other parts of the Island.

19. It is possible of course to suppose, if the disease was once introduced, it may have made its way to those remote parts where it found a suitable home among the ill-clad, ill-homed, and ill-fed people, surrounded as they are by all insanitary conditions.

20. In the definition which is given of Parangi all forms of disease are excluded, except the one which is considered to be Yaws or one closely allied to it ; however, in reading the reports and cases, and in examining the illustrations which accompany these remarks it should not be forgotten that more than one disease is probably described and illustrated, although much care has been taken.

21. Parangi may be defined as a specific disease, produced by a variety of causes, all contributing to debility of the general system and traceable to poverty, innutritious food, impure water, and residence in insanitary dwellings in malarious localities ; propagated by contagion, generally, through an abrasion or sore, but sometimes by simple contact without any solution of continuity being present or recognisable ; marked by an ill-defined period of incubation, by certain premonitory symptoms referrible to the general system, and by the evolution of successive crops of a characteristic eruption passing on in severe cases, and in weakly subjects, into unhealthy and spreading ulceration, whose cicatrices are very prone to contraction ; running a definite course ; attacking all persons irrespective of sex or age; and amenable to appropriate treatment.

Etiology.

22. The etiology of the disease is still obscure. The cause, whatever it is, has not been ascertained, but little doubt exists as to its existence in the discharges coming from the eruptions and ulcers. It seems exceedingly doubtful if it exists in the natural secretions; and with regard to the milk, it may be stated that it does not exist there, for the reason that healthy children, begotten of a diseased parent and nursed by her, have frequently not developed the disease.

23. It is a circumstance worthy of consideration and investigation that the geographical distribution of the disease in this Island is that of deficient water-supply and the use of artificial tanks for the storage of water. This is no mere coincidence. It seems to be of considerable etiological significance, as pointing to the water as faulty and probably causative of the disease.

24. The tanks, as a rule, furnish all the water needed for the various uses to which man subjects it, and the character of the water is so equivocal as to have arrested the attention of all engaged in the study of Parangi. The tanks further harbour during the warmer parts of the day all the cattle of the neighbourhood, and naturally add thereby largely to its doubtful—nay, filthy character.

25. Climatic influences are also not without import in the causation of the disease. It has been noted that the setting-in of the wet weather is generally the prelude to a fresh outburst, and to an aggravation of the pre-existing disease. Whether this be connected with disturbance of the tank water during the downpour, the setting free of malarial poisons, or both, has not been settled. As somewhat to the point, it may be mentioned that the increase in malarial fever is also cotemporaneous with the advent of wet weather.

26. The habitations of the afflicted are such as seem peculiarly adapted to the fostering of disease, and perhaps of generating it. Ventilation is an unknown art. The salutary influences of light and air are not heeded. The habits and customs of the people are filthy in the extreme, and personal cleanliness is seldom attended to. The food is innutritious and deficient, especially in nitrogenous elements. The staple food is a grain

cultivated largely and known as kurrakan.* Rice is a luxury. Game and meat are very rarely used for food, and when meat is obtained generally it is cut in strips, dried and eaten at varying intervals till the supply is exhausted.

27. Whether any disease in the grain eaten is accountable for Parangi, is not settled. There is nothing in its appearance to justify such a supposition. As kurrakan is a "dry grain," and only requires little moisture, a district where it is grown means one where water is deficient and consequently impure.

28. In this connection, it must be mentioned that marriages of consanguinity, undertaken at very early ages, and frequently where both are diseased, are not without some causative influence, if not in the production at least in the propagation of the disease. It only remains now to examine the nature of the soil of the various districts afflicted with Parangi. It generally consists of a sandy loam particularly suitable for the cultivation of grain, were it not for the want of moisture due to frequent and prolonged droughts. The country is generally overgrown with shrub and low jungle, and forests of valuable timber occur at places. The country is level, but interspersed here and there with hillocks of varying altitude.

29. In regard, then, to the etiology of the disease, it may be stated that several factors are in operation, and that the chief of these appear to be innutritious food and bad water, residence in ill-ventilated and ill-constructed buildings massed together in close proximity to each other, and other circumstances which contribute towards a debilitated state of the system in a pauperised and unclean people.

Symptoms.

30. In describing the symptoms, the accurate description given by Mr. Garvin, M.B., is followed.

The symptoms which characterize Parangi disease may be referred to four stages. The first stage comprises the period of incubation or latency, which is unmarked by any peculiar phenomena, and varies in duration from two weeks to as many months. The second stage comprises the premonitory fever—the earliest indication of constitutional disturbance—and which generally terminates with the evolution of the eruption, viz., in a period varying from two to seven or eight days. The third stage commences with the eruption, and terminates with the complete resolution of the disease or its passage into the fourth stage or that of sequelæ. The two last stages together cover a considerable period, in some cases as many as six or eight years. Passing over the first stage, which, for obvious reasons, is seldom noted, there are certain symptoms which invariably accompany the second stage, and have been noted and recorded by all observers. These symptoms point to the general system, and consist of slight pyrexia accompanied by a feeling of *ennui* or *malaise* and pain in the majority of the joints of the body. The character of the pain has been variously described, but usually as of a dull, running or shooting kind.

31. It may here be mentioned that the disease is nearly always preceded by an ulcer, generally situated above some bony prominence and caused by scratching. It is shortly before, or on the healing of this initial sore, that the symptoms of the second stage declare themselves. In the third stage the characteristic eruption appears and passes through its various phases. The evolution of the eruption is in successive crops; the first appearing generally on the face, the next on the body, and the last on the extremities. There is, however, really no order in the evolution, and the positions are frequently reversed. It is frequently noticed that the first eruptions appear around the cicatrix of the initial sore, and thence extend to the different parts of the trunk and extremities.

32. A careful examination of the eruption would seem to favour its division into three forms, differing only in minute particulars. The prognosis being, however, much affected by the character of the eruption, a close description of each will be necessary.

33. In all forms the eruption first appears as papules, bearing a striking resemblance to acne or lichen: certain changes then ensue, and upon these changes the varieties depend. In the mildest form the papule gradually acquires a yellow tinge, sinks to the level of the surrounding skin, and while extending in one direction generally heals at the opposite, this latter process being indicated by a slight depression and pigmentation of the skin.—(Plate No. 11.) In this variety, which may be designated lupoid, in reference to its peculiar mode of extension and healing, there is no abrasion or loss of substance of the cuticle, but upon the eruption healing slight desquamation occurs, and the restitution of the part to health is unattended by any discharge or exudation. In the two next varieties the changes which ensue are peculiar and striking. The papule, which was no bigger than a pin's head, increases rapidly in size till it becomes as large as a pea, or larger. It stands prominently out of the skin, and its apex begins to become rough from desquamation of the epithelium. Then a sort of glucy matter exudes and binds the exfoliated epidermal scales together, the papule shrinks and acquires a brownish yellow hue, and a crack or fissure occurs where the sound skin joins it. The eruption is now perfect, and possesses a great resemblance to Rupia; only the crust is less conical, cockle-shaped and stratified.

* Elusine Corocana.

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To this form of the eruption the term rupial or rupia-like may be applied.—(Plates 12 and 14.)

34. If during the hypertrophy of the papule and the exudation at its apex of the gluey matter, it be subjected to rough handling or friction, or if there be much debility, the exudation becomes excessive, and the crust softens and becomes removed as quickly as it is formed. In this way the papule enlarges generally all round, pus exudes from the subjacent sore, and a dirty yellow soft crust forms. To this variety, from its great resemblance to Condyloma the designation condylomatous may appropriately be given.—(Plates 2, 10, 11, 13, 14, and 16.) The process by which healing takes place is simple. In the lupoid form it has been stated how it occurs. In the rupial or rupia-like form the peculiar crust loosens gradually and falls off or is removed, exposing a sore underneath. This sore is, as a rule, exceedingly clean and healthy, the granulations standing out individually, and it appears like a ripe raspberry or, when magnified, like the "edible portion of a pomegranate."—(Vide illustration, plate 12). In those cases where the crusts drop off spontaneously, the subjacent sore is found healed over and deeply pigmented. If the crust be removed before this has taken place, the sore is speedily overrun with lymph, and generally heals over in a couple of days. The crust is never reproduced even in immature papules. The method of healing in the condylomatous variety is as in ordinary ulcerations, viz., by the development of cicatricial tissue from the circumference inwards.

35. In all cases the resulting cicatrix is deeply pigmented, the pigmentation seeming to reach its height in about a week, and then gradually declining, till, at the expiration of several months, the part appears restored to its usual appearance and state.

36. This is the history of the eruption of Parangi in unfortunately a comparatively few cases. When the disease passes on to its fourth stage, the eruptions break down, the subjacent ulcers become unhealthy, spread rapidly, destroying the skin to great depths, the discharge becomes profuse, the pain great, the desire for food is abolished, emaciation ensues, and the general health of the patient suffers so much, that he is no longer proof against nor able to combat ordinary inflammatory diseases; an attack of one generally is the last event of his life. When the patient survives the fourth stage, and the ulcers heal, the most horrible distortions and deformities ensue from the contraction of the cicatrices, and render him a misery to himself and his surroundings.—(Vide illustrations, plates 5, 6, 8, 15, 17). All these and the various diseases of the bones, &c., may be correctly ascribed to the abuse of a remedy which in skilful hands contributes to the cure of the disease—mercury.

37. It has been mentioned that the eruption occurs in successive crops and over the face, trunk and extremities. It frequently occurs also on the fauces, soft palate and base of tongue. In these situations the distribution of the eruption is sometimes nearly symmetrical, but, as a rule, irregular. In a great number the eruptions retain their individuality, while in other and in particular situations such as the axilla, cleft between the nates, &c., the eruptions run into each other, become confluent, and cover considerable patches of surface. In other cases, again, the eruptions are disposed circularly and include a portion of sound skin or old cicatrix—(Plate 1.) The disposition of the eruption is never observed in the course of nerves.

38. When the eruption attacks the soles of the feet and gives rise to the condition known as *Dumas*, it presents some peculiarities. The horny cuticle protudes and becomes very painful, and in a short period ruptures and gives egress to a fungoid growth covered with a dirty yellow scab. This fungoid growth consists of hypertrophied papillæ and fibrous tissue.

39. Microscopic examination of the tissues reveals nothing more than hypertrophied papillæ, and the morbid action would appear to be limited to the epidermis, and to consist of a rapid proliferation and necrosis of its elementary cells.

40. The blood presents no peculiar changes, and the relative proportion of the colored and colorless corpuscles would appear to be normal.

41. There are certain important points in the history of the disease which may be discussed and elaborated here. The questions of heredity, and the contagious or non-contagious nature of the disease, may be examined together. Opinions are divided on the first of these questions, but they seem to point more in the negative than in the positive direction. No cases are recorded of the disease being developed congenitally, though several records allude to children shortly after birth developing the disease from contagion. Much depends on the signification attached to the word "hereditary." There can be little doubt that the offspring of those afflicted develop the disease more frequently; but this is due to the persistence among them of those causes which originally contributed to the outbreak of the disease, and to the enhanced risk of contagion. The offspring of the afflicted cannot be said to be necessarily possessed of weakly or vulnerable systems, for recorded cases are against this view. It may, in short, be stated that the disease is not hereditary. With regard to its contagious nature, little doubt remains. In fact the *de novo* origin of cases is considered by many exceedingly problematical, owing to the multifarious ways in which contact may be brought about, and the inevitable result of such contact be it ever so slight. Against the view of the contagious nature of the disease, it may be urged that no cases have arisen from contact or association with the afflicted in the wards of a hospital or of the propagation of the disease to the dressers and attendants. This is easily explained when we view the surroundings of a hospital, as contrasted with those of

a hotbed of the disease. In one case, sanitation and the laws of health are in the ascendant; in the other, totally disregarded.*

42. For the propagation of the disease it is absolutely necessary that the disease shall be in contact with the healthy tissue even though an abrasion in, or a broken state of, the latter be absent. The same applies to the sexual act, the suckling of diseased children, and the thousand and one ways in which contact occurs between healthy tissues and the virus resident in the eruption, in the discharges from them, and in the clothing impregnated with the discharges.

43. The disease has been ascertained not to be auto-inoculable (as the experiments of one of the reporters shew).

Whether the disease is capable of transmission by the various natural secretions, is open to much doubt. That the milk is innocuous is conclusive, in that often children suckled by a diseased parent have retained their health throughout, and been free through life of any of the manifestations of the disease.

44. The disease, however generated or acquired, usually runs a definite course—*i.e.*, to the conclusion of the third stage in those who enjoy skilful treatment or are left solely to nature; unskilful interference only prolongs the disease, and there is reason to believe produces those horrible sequelæ detailed above. The average duration of ordinary cases of Parangi (unaffected by treatment) is about six months, though it sometimes is shorter and frequently longer. If the fourth stage be included, the duration is very great, and varies, with the nature and severity of the local manifestation, from two to eight years or more.

45. The disease attacks all people alike, though, as a general rule, the well-fed and comfortable are affected only slightly, or by the milder forms, and shake off the disease sooner than the ill-fed, ill-clad, indigent and dirty. It is a matter of doubt whether a person once attacked enjoys an immunity from the disease. Cases occur from time to time with what appear to be fresh attacks; but, upon careful examination, it is ascertained that the first attack was really not totally eradicated, and that one or two eruptions existed when treatment was discontinued. A proper cure once effected would seem to render a recurrence at least doubtful.

46. The disease, although appearing formidable, seems to exercise very little influence upon the general health, unless it be maltreated and pass on into the various sequelæ. The people suffering from it appear to live to a ripe old age, and instances of long life are not wanting among them.

Nature and Diagnosis of Parangi.

47. The opinions advanced as to the nature of Parangi are varied. It is supposed to be tertiary Syphilis degenerating into Leprosy (Danforth, Maartensz); a syphiloid disease resembling Sibbens or Sivvens, once very prevalent in the south of Scotland (Loos); a tertiary Syphilis kept alive by intermarriage, diluted by time and occurring in the form of Lepra (Loos, Vaitialingam); a disease *sui generis* allied to Syphilis (Attygalle); and not allied to either Syphilis or Leprosy (Modder); and, lastly, the Yaws or Frambœsia of the West Indies slightly modified (Garvin, Vandersmagt).

These opinions, the outcome of much thought and observation, do not admit of reconciliation, and an inquiry into the differential diagnosis of the disease will therefore be necessary in attempting to set the matter finally at rest. Again, it should be borne in mind that under the term Parangi several diseases have hitherto been described, and the diversity of opinions expressed as to the nature of the disease may thus be explained. The diseases which Parangi resembles are Syphilis and its varied manifestations—Lupus, Leprosy, and Frambœsia.

48. There seems to be very little ground for supposing Parangi to be Syphilis or its manifestations. The resemblance is restricted to the peculiar eruption, the occasional disorders to which the bones are subject, and to the curative property of mercury in both diseases. If a careful enquiry be made into the history of the case, there is a total absence of any reference to a primary infecting sore. When a sore does exist on the penis, it is generally secondary to the evolution of the eruption. The eruption is frequently found on children and youths perfectly innocent of sexual desires or gratification. The eruption, though resembling Rupia, differs from it in several respects. It is not a pustular eruption, the scab is not reproduced once it is removed; it is less stratified and cone-shaped, and the subjacent sore is, as a rule, healthy.

The condylomatous variety resembles the mucous tubercles of Syphilis; but in Parangi there is no particular situation for them, the verge of the anus and other parts of the body being attacked alike. The eruption of Parangi resembles then the secondary stage of Syphilis, but it is questionable whether the eruption of Syphilis could be transferred from generation to generation, and yet remain in the same stage. Instances occur where the children and parents are at the same stage of the Parangi disease, and where a child communicates the disease to the previously healthy father. In Syphilis, the case is different, and healthy parents never beget children who develop the disease shortly after

* Case No. 13 (illustration No. 12) recorded by Mr Garvin seems to trace his illness to contagion in a hospital ward, and Mr. Garvin, in his report, seems inclined to entertain that view of its origin.

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birth. Allowing that Parangi is tertiary Syphilis, only modified by the unusual occurrence of the eruption peculiar to its secondary stage, the question arises—Is tertiary Syphilis transmissible by inheritance? This has been answered in the negative by competent authorities.

Again, in nearly all cases of Parangi we miss the characteristics of transmitted Syphilis. There is no history of frequent miscarriages, the children are never born with the disease, they are not as a rule unhealthy, nor do they develop signs peculiar to inherited Syphilis; their teeth are not bad, nor do they exhibit the abnormal appearances pointed out by Hutchinson, the bodily development is not interfered with, there is no epiphysial or glandular enlargement, and the eyesight is never affected. The parents frequently exhibit none of the later symptoms of Syphilis. In Parangi, in some cases, the bones suffer, and peculiar indolent ulcerations take place; but this has been allowed by the staunchest supporter of the syphiloid nature of the disease (Loos) as frequently due to the abuse of mercury; and he states that he has not been able to find indications of Syphilis in new-born infants.

With regard to the beneficial effect of mercury in both diseases, little need be said. Standing by itself, it cannot be considered a criterion meriting more than a passing notice.

It may therefore be confidently asserted that Parangi is not Syphilis, and is in no way related to that disease.

49. Lupus is a disease to which Parangi certainly bears little likeness. In the later stages the ulcers acquire characters like those of Lupus, but are then really cases of Lupus engrafted in the disease on the fearfully destructive results of promiscuous mercurialization. Lupus is, moreover, much less generally diffused than Parangi, and its destructive effects on the tissues are more marked. The mode of origin, the history, constitutional signs, results and treatment are widely different in the two diseases.

50. Parangi can hardly be confounded with leprosy, the peculiar appearance of the skin, of the lobes of the ear, the nodular growths, the anæsthesia, the enlargement of prominent nerves, the gangrenous ulcerations, and the peculiar feebleness of the system, are all so characteristic of the latter.

51. *Frambœsia, or Yaws*, is the disease to which Parangi bears the most striking likeness. The history of both is identical, and the minor points of dissimilarity may be easily accounted for by ascribing to the climate and surroundings generally some modifying influence.

The absence of the raspberry-like excrescence in Parangi is not invariably the case in that form of it known as "Dumas."—(Vide plate 4*a*.) This fungoid growth is well marked, and although it does not really resemble a raspberry, it certainly tallies with the description given by Dr. Imray, viz., a piece of coarse cotton wick dipped in a dirty yellow fluid and stuck on the skin in a dirty, scabby, brownish setting. The presence of affections of the bones and destructive ulcerations in Parangi cannot be urged as points of difference, as these results are traceable to unskilful treatment, and do not probably possess any relationship to the disease itself.

In every other point the similarity of the two diseases is unquestionable, and as these points have appeared in detail under the symptoms, no reference to them appears necessary at this place.

Prognosis.

52. It has been mentioned that although a chronic and unsightly disease, Parangi exerts but slight influence on the general health and longevity of its victims. It is by no means a fatal disease, and the prognosis is generally favorable, and is affected by the nature of the eruption. In the lupoid variety, the restoration to health is rapid and perfect; in the rupial variety, the disease runs a more chronic course; and in the condylomatous variety, the disease is intractable, and frequently, particularly under unskilful treatment with mercury, runs into the stage of sequelæ.

The prognosis becomes gloomy when rapid debility and ulcerations occur, and a fatal termination is generally due to some intercurrent disease.

Treatment.

53. The treatment of Parangi may be considered under the two heads "Medicinal" and "Dietetic."

The medicinal treatment varies with the stage of the disease. In the second or febrile stage everything which will facilitate the appearance of the eruption should be adopted. There is no greater mistake than endeavouring to repress the evolution of the eruption. For this purpose all medicines which act on the skin and increase the cutaneous circulation may with advantage be employed; but none will prove so effectual as the employment of warm baths in combination with diaphoretics, diuretics, and the use of warm clothing, or powders of sulphur and cream of tartar.

When the disease has passed into its third or eruptive stage, a material alteration is necessary in the treatment. At this stage the employment of mercury suggests itself. In the various nostrums used by the vedarálas, mercury forms a prominent ingredient, but baneful effects traceable to its unskilful use ought to be a sufficent reason for discontinuing it or using it only sparingly. It may be stated with regard to mercury that, though in some of its forms it is a useful drug, it does not appear to be essential. It cannot be

regarded as a specific for the disease; it probably acts as a powerful alterative eliminant. The best method of giving the drug is by fumigation or by external application, the process described by Lee being adopted in the first case, and the diluted citrine ointment rubbed into the eruptions in the latter. Should it be decided to give mercury by the mouth, the perchloride is the salt to be selected, and it should be given in combination with the iodide of potassium, the latter aiding the alterative action and the elimination of the mercury after it has had time for its operation. In every case care should be taken that pytalism is not produced, and directly the gums commence to exhibit signs of redness, heat, tumefaction, it should be suspended. The resumption of the drug will depend upon the result of its first trial, and should this have been attended with marked benefit a cautious use of the drug may be resorted to.

In cases marked by debility, the treatment described above should be supplemented by the use of tonics, such as cod liver oil and the syrup of the iodide of iron. Particular complications and symptoms call for particular treatment. This is notably the case with the running or flying pains, for which nothing is so efficacious as a large dose of iodide in combination with the bromide of potassium.

In "Dumas," the protuberant fungoid mass should be destroyed with strong nitric acid, or excised, and the raw surface touched with lunar caustic. To obviate the distressing pruritus which occurs in the condylomatous variety, particularly when situated near the verge of the anus, calomel ointment appears highly efficacious. Instead of the local use of any mercurial preparation, an ointment made with carbolic acid or any stimulating oleaginous application may be used. Arsenic is a remedy which should be used more extensively, and a decoction made of *Smilax chinensis* or the root of the *Hemidesmus indicus* may be utilized as a vehicle for its administration. The combination of sulphur and cream of tartar is also useful at this stage, particularly in the case of children and delicate women.

For the extensive and unhealthy ulcerations, local treatment is generally useless, unless combined with appropriate constitutional remedies. As these ulcerations in the main depend upon the injurious use of mercury, iodide of potassium should be exhibited to overcome and eliminate it, and the local treatment should be of a stimulating character. A lotion containing the tincture of iodine, a strong lotion of carbolic acid (two drachms to the pint), turpentine ointment, and cod liver oil, seem particularly useful. Where the ulcers are very indolent, the liquor epispasticus may be applied, and a large warm poultice placed over all. If the cicatrix be very dense and interfere with the healing of the ulcer, it may be separated from the surrounding skin by a deep cut carried round it, or it may be excised. The lesions in the bones, abscesses, &c., which hardly belong to the disease, should be treated on general surgical principles; but it should always be remembered to what they, as a rule, owe their origin, and appropriate constitutional treatment be used in combination. Should the ulcers partake of the character of Lupus, the surface should be destroyed for a considerable depth, or the lupoid growth removed by scraping with a sharp spoon.

54. Although the medicinal treatment is of great importance, this is very much enhanced by a due regard to the diet, cleanliness, &c., of the patient. The food given should be of a light, nutritious kind, and changed from time to time, so as not to tax the appetite of the patient too much. As much of the food used in districts where the disease is endemic is of a non-nitrogenous character, care should be taken that the diet be rich in flesh-forming and fatty materials.

Children at the breast should have cow's milk in addition to the precarious supply from the mother. Alcohol is better avoided, unless there be marked indications for its use.

Lastly, everything that will conduce to the comfort of the patient should be adopted: cleanliness may be best obtained by a daily warm bath with the free use of soap, and a change of clothing whenever necessary. In view of the possibility of the contagion being acquired in the hospital ward, cases of Parangi should not be mixed with others; and the clothing, bedding, and utensils used should also be different in the two cases.

Prophylaxis.

55. Vigorous efforts for eradicating the disease should be made. Under the etiology of the disease, reference was made to the character of the people, the dwellings, &c. These points should in every case receive due attention. It will not be out of place to consider in this connection the steps which have already been taken with this view, and the results which have accrued therefrom. Hospitals have been established for the reception and treatment of patients, and are situated in the heart of the country where the disease prevails. Medical aid is brought, as it were, to the doors of the people. The results have however not been of an encouraging nature, and point to the system of dispensary relief, so ably put forward by Dr. Loos, as unreliable and certainly not of lasting benefit. In the record of cases frequent reference is made to patients returning from time to time with the disease. This argues doubtlessly that the people are alive to the benefits of skilful treatment; but it argues also that hospital or dispensary treatment cannot, of itself, be viewed as sufficient for the eradication of the disease. Moreover, when the peculiar apathy of the people is taken into consideration, the highly insanitary state of their dwellings, their relapse into all old habits which were so fruitful previously in producing the disease, there can be no doubt that hospital or dispensary treatment, unbacked by other means, is

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nearly useless in eradicating the disease, and only brings about a false state of security. For, relying upon hospital treatment, sanitation, cleanliness, &c., are set at defiance with the inevitable and lamentable result of a re-appearance of the disease.

The system of irrigating the country by restoring the ancient tanks, is absolutely necessary, and the eradication of the disease can be effected only by the march of civilization. Analogous instances we have in the disappearance of the Sibbens disease of Scotland, and Leprosy from most of the countries of Europe. That Parangi is a disease due to innutritious food and destitution, is beyond doubt. It finds a congenial soil among the indigent of the Vanni, a people remarkable for their ignorance of all matters relating to agriculture, for their apathy and helplessness. They rely solely upon slight efforts in cultivating the soil, the failure of a crop—a by no means unfrequent occurrence—meaning destitution and its accompaniment – disease. The remedy for this state is everything that will improve the material prosperity of the people and the land they live in. There should be no half measures adopted, but a system of rational agriculture, presided over by a competent Commissioner, should be introduced, and though many prejudices will have to be met and overcome, the people should be gradually weaned from their apathy, and brought to exert themselves so as to better their condition in life. Success may not be rapid, but it will eventually come, provided only the measures are enforced in no half-hearted manner or by persons wanting in energy. As a result of this, the condition of the people will necessarily improve, the food supply will not be inadequate or of doubtful quality, the supply of water will be better than at present, and gradually sanitation and the laws of health will come to receive due attention and recognition, and a civilized community in a prosperous locality be the result.

Combined with the irrigation of the country, the restoration and building of tanks, and the enforcement of a rational system of agriculture, roads may be opened up so as to make the chief towns easily accessible to even the most remote; experimental gardens may be tried, and a reward offered to pioneer efforts in civilizing and cultivating hitherto inaccessible and little known regions. The various revenue officers of the Government will doubtless interest themselves in these matters, so likely to contribute to the prosperity of their agencies and the people under their immediate charge, and energetic action on their part in enforcing all matters referred to, with kind and considerate treatment and combined action on the part of the medical officers of the various districts in the treatment of the diseased, must necessarily bring about a state incompatible with the persistence of a disease which has decimated the land for the last century.

56 Some points alluded to in the papers which accompanied this report require a few remarks.

(*a*) On the question of the propagation of the disease by means of vaccination alluded to in the extracts from the administration reports of Messrs. Morris and Steele, the most careful enquiries have been made, and it is satisfactory to be able to state that there is absolutely no evidence in proof of the assertions.

Parangi prevails in districts where, owing to its existence, it is impossible to carry on vaccination from arm to arm, and in the analysis of the cases in the register, a copy of which is given, it will be found that out of 241 cases recorded, the disease appeared in 57 before vaccination, in 48 who were never vaccinated, and in 134 in persons who were vaccinated at some time or other; but in none was there any connection between vaccination and the appearance of the eruption of Parangi. In two cases it is not stated whether the patients were vaccinated or not.

(*b*) On the question of inoculation, which is practised in Africa and the West Indies by the Negroes on the estates, to acquire Yaws and to escape work, allusion is only made by Mr. W. D Wright, when Government Agent of the North-Western Province; in his Administration Report for 1871 he says:—

"When reading a few years ago Dr Loos's report about Parangi, I do not remember having seen any notice of a means of preventing the sad consequences of the disease by a species of inoculation, and will therefore describe the practice in the remote parts of Vanni District. It is to make children, when they are about one year old, partake of rice off a leaf or plate on which a person suffering from the disease has eaten. In a short time, pustules like itch, appear on the child's body, and then medicines containing minute quantities of mercury are administered, which cause the pustules to dry up in seven days, the scales to fall off, leaving deep dark marks which in course of time disappear. It is said that this is an almost certain prophylactic, and that though the disease may attack one who has been so guarded, the effects are never serious."

W. R. KYNSEY,
Principal Civil Medical Officer and
Inspector-General of Hospitals.

Colombo, 21st March, 1881.

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ANALYSIS OF REPORTED CASES.

RECORDED CASES.

ANALYSIS OF THE CASES RECORDED IN THE REGISTERS.

Number of cases ...	241.
Age in years ..	One to five, 20; six to ten, 24; eleven to fifteen, 19, sixteen to twenty, 32; twenty-one to twenty-five, 23; twenty-six to thirty, 35; thirty-one to thirty-five, 24; thirty-six and upwards, 63; not recorded, 1.
Sex	161 Males, 78 females, and 2 not recorded.
Race	166 Sinhalese, 36 Malabars, 7 Moors, 30 Tamils, 1 Canarese, and 1 Coast Cooly..
Occupation or condition ...	68 Cultivators, 2 Potters, 1 Tappal-runner, 12 Coolies, 1 Cattle-keeper, 5 Farmers, 5 Labourers, 2 Dhobies, 1 Trader, 1 Baker, 6 Beggars, 2 Masons, 2 Fishers, 1 Boutique-keeper, 1 not recorded, and 131 of no occupation.
Duration of disease previous to admission. ...	One month and under, 10; above one and up to two months, 9, above two and up to three months, 19, above three and up to six months, 31; above six months and up to one year, 29; above one and up to five years 63, above five years, 77; not known, 2; not recorded, 1.
Physical condition on admission. ..	Cachectic, 38, anæmic, 8; emaciated, 59; healthy, 92; ill-nourished, 1; ulcerated, 1, debilitated, 3; broken health, 1; pale and weak, 1; bilious temperament, 1; sallow-looking, 3; bad, 1; delicate health, 1; not recorded, 31
Is it a first or second attack?	First attack, 153; second, 50; third, 6; fourth, 2; fifth, 2; sixth, 3; seventh, 1, tenth, 1, several attacks, 4; unknown, 2, not recorded, 17
Form of disease .	Pustular, 36, ulcerative, 83; nodular, 3, tubercular, 15; papular, 8; scaly eruptions, 13; vesicular, 3, condylomatous, 1; rupial, 2; psoriatic, 6; scabby, 1; puck parangi, 8; gadi parangi, 2; dada parangi, 1; oddi parangi, 1; mulberry-like eruptions, 9; and not recorded, 56; (a) primary, 68; (b) secondary, 112; tertiary, 2; (c) sequelæ, 26; and not recorded, 33.
Any other members of the family affected, if so, how many? ...	In 27 the whole family, in 12 parents only; in 5 fathers only; in 13 mother and others; in 22 parents and others; in 2 wife and children; in 6 wife and others; in 8 one member only; in 3 four members; in 1 son only; in 4 mother only; in 3 husband only; in 3 sister only, in 3 child only; in 3 husband and others; in 1 daughter only; in 25 ten other members; in 1 niece only; in 3 wife only; in 1 a great many, and in 95 not recorded.
How did the disease commence, any scratch or sore on body previous to its appearance? .	Sores, 54; ulcer, 32; abrasion of skin, 2, scratch, 33; wound, 24; boils, 13; burns 3; papules, 7; itch, 2; numbness, 1, tumor, 2; eruptions on different parts of the body, 3, running pains in limbs, 1; chilblains, 2, venereal diseases, 2; acne, 1; pimples, 3; nettle-rash 1; impure sexual intercourse, 1; abscess, 1, warts, 2, tubercles, 1; unknown, 36, and not recorded, 14
Do many people in village or district suffer from a similar disease? ...	In 90 instances, a few, in 71, many, in 64 almost the whole population, in 1 case all; in 9 not one; in 4 unknown, and in 2 not recorded
To what cause is the disease attributed? ...	125 to contagion, 2 to ulcer; 19 to hereditary predisposition, 21 to unhealthy climate, 2 to chilblains, 1 sore; 8 constitutional; 3 to vitiated blood; 2 to syphilis; 14 to unwholesome food and bad water; 1 to local irritation, 1 to wound; 29 unknown; and 13 not recorded.
Ever suffered from any form of venereal? ...	9 gonorrhœa, 3 hard chancre, 1 gonorrhœa and syphilis; 1 soft chancre; 1 gonorrhœa and bubo, 10 not recorded; and 216 never had any venereal disorder.
Vaccinated or not? Did disease appear before or after vaccination?	57 had before, and 134 after the operation was performed, 2 not recorded; and 48 were never vaccinated
Treatment previous to admission? Was mercury given or not? ...	5 were under European, and 44 under native treatment; 1 had European and native treatment; in 97 cases mercury was administered; 9 had mercury and China root; 6 China root only; 3 unknown; and 76 had no treatment of any kind.

PARANGI DISEASE.

HISTORIES OF CASES.

HISTORIES OF PARANGI PATIENTS DRAWN UP BY THE MEDICAL OFFICERS WHO HAD CHARGE OF THE CASES, AND ILLUSTRATED BY A SERIES OF WATER-COLOUR DRAWINGS.

1st Case.—Illustration No. 1. Anuradhapura.

Reported by Mr. G. P. Schokman, M.B.

Sera, aged 5; Sinhalese; belonged to the village of Pandiankadawella, seven miles from Anurádhapura.

Family History:- Father alive; mother died of child-birth four years ago; father had the disease when three years of age; now perfectly well, not even a scar to be seen on any part of his body. Family consists of two: a girl (the elder), eight years old and not affected with the disease yet, and the patient.

The disease first made its appearance about two months ago as a small vesicle on the front of right knee-joint, and from the excessive irritability of the part an ulcer soon resulted, which was followed by eruptions on other parts of body.

The patient is thin, weak, and of a sickly appearance; has a large oval patch on right femoral region, depressed, blackened and smooth in its centre, with several small tubercles at its circumference of the size of a split pea, dusky, flat and smooth, and those at the upper part of its circumference covered over with yellowish crusts; circular ones of the size of a sixpenny piece on the middle of right thigh, and left femoral region nearly flat, but slightly depressed in its centre, covered over also with a yellowish translucent crust. An ulcer situated in the lower part of left arm healing from above, has a similar appearance to the one described in the right femoral region. A small irregular patch on the left cheek, brownish-black in appearance and surrounded by an inflammatory areola; presents a raw appearance on removing a portion of it, with a slight viscid discharge. The inner margins of both feet present an appearance of exfoliation of cuticle and a honey-combed appearance at the under-surface of the great toes involving the deeper tissues, so that great pain is complained of on pressure of the feet against the ground; small pealing off of cuticle over the right thumb and at the web of the middle and ring-finger of the left hand.

2nd Case. Illustration No. 2. Anuradhapura.

Reported by Mr. G. P. Schokman, M.B.

Tickera, 16 years of age; Sinhalese; belonging to the same village, seven miles from Anurádhapura; by occupation a cultivator, gives the following statement:—

Family History:- Father died of chest affection, thirteen years ago, mother alive about fifty, and in apparent good health. Both parents affected with Parangi in childhood. A large family of eleven, only two surviving—the patient and one elder brother.

When three years of age, large patches of eruptions appeared on various parts of his body, nates and face included, which in the course of a year got well without any treatment whatever. Enjoyed very good health after this, till he was eight years old; when at work in the jungle a small break of the skin on the outer part of right ankle, resulting from the prick of a thorny tree, formed soon into an ulcer which was very intractable to treatment. Three weeks after this he felt severe pains in his limbs, which was followed soon after by the appearance of several indolent tumours, running on to ulceration and leaving behind scars on the lower part of right half of chest, the inner and back of left elbow and the outer part of the gluteal region (right).

Present condition:- Fairly nourished, has two cicatrices in the right infra-mammary region, separated from each other by healthy skin; the outer larger, presenting a reticulated glistening appearance, pigmented, darker in some parts than in others, involving only the skin which can easily be raised from its under-cellular tissue, but rough and extremely uneven on its surface.

A pear-shaped scar on the inner part of left elbow, presenting a glazed appearance with pigmented patches at its lower circumference, contracts the elbow-joint, so that the fore-arm can only be brought to a position midway between semiflexion and full extension; large node on the back of left ulna.

The tissues round the right elbow-joint are considerably thickened, and the lower end of both bones of fore-arm much enlarged, hard and slightly painful on firm pressure.

The anterior surface of both tibias are similarly affected with nodes, and the crest of the left one slightly arching forwards.

Patient is now free from eruptions of any kind, and the pains so commonly complained of in this affection; no history of Syphilis.

3rd Case.—Illustration No. 3 a & b. Mihintalai.

Reported by A. Appavupillai.

Thalla; a male sucking infant of the Siṇhalese dhoby class, aged two years. The child is a native of Thariankulam village in Kananthara-kóralé. He was attacked on February last, and he looks robust and sound in health. This is the first attack. This is of the primary form, and is tubercular in character.

He is the only offspring of the parents, who have had the disease in their infancy, but who were entirely free from any trace of it at the time; the child became affected during conception.

The child had simple itch ("hori," as the Siṇhalese call it), which was treated in the ordinary way and cured. But two of the eruptions, one on the left toe, and the other at the inner aspect of the knee-joint, did not heal.

Three weeks or so after these eruptions, and particularly the one in the toe, were observed, two eruptions came in the cheek and then others in other situations.

There are none in the village affected with a similar disease. [Although the parents say that there were none in the village with a similar disease, I know of a certainty there were several in the village at the time the child was affected, whom I treated for Parangi.] They are unable to trace how the disease came in; the child never suffered from any form of venereal disease, was never vaccinated; the child lives entirely on its mother's milk (breast); rice is the principal food of the people. No treatment in the way of medicines either internally or locally.

History of the case:—The child is, as already noted, very healthy-looking and of bilious temperament.

The mode of onset of the disease was as follows:—The child had pustular eruptions identical with itch all over the body, which healed under appropriate local treatment. Two of the eruptions, one in the left toe and the other in the right knee-joint, did not heal. The one in the toe enlarged more than the other, which was in the inner aspect of the knee-joint.

The relatives of the child are unable to say which of the two preceded the other, since they observed them (the eruptions) at about the same time, but could only guess that the sore in the left toe preceded.

About twenty days after, two eruptions made their appearance in the cheek, one on either side; no constitutional symptoms preceded, attended, or followed the progress of the eruptions.

(a). The first stage varied greatly as the others did and do; but taking the majority of eruptions, the first stage lasted a few days (from four to fifteen).

(b). The duration of the second stage is also indefinite.

The earliest eruptions, including the original sores, have stood over three months and have not as yet healed, while those that broke out subsequently have some of them healed, and many more are in the course of healing. The disease is likely to stand some five or six months. The tubercles are attended with itching, and marks of scratch are to be found. Every part of the body is thickly covered with the eruptions except the head, part of the hands and soles of the feet, where they are scanty; the eruptions were observed first in the left toe and knee, as already noted, then in the face, then in the buttocks, scrotum, and about the arms.

The patches are of various size and shape, formed by the coalescence of two or more papules or tubercles. Those in the nates and legs are much larger than those in the other localities. Some of them, as in the nates, are oval and elongated, a few circumscribed, while a good many are irregular-shaped. There are papules and tubercles of every size and stage, varying in size from that of a millet seed to that of a tubercle over half an inch in diameter. They commenced in small, round, solitary papules which were white, dry, smooth and glossy. In four or five days they began to enlarge and were attended with itching.

There are more evolutions than one. The papules in the buttocks and back are of very recent date and belong to the sixth or the fifth crop, if it may be called so. In fact there is no order in the succession of these crops of papules, and the eruptions heal at every stage of the disease. The earliest eruptions are much more enlarged than the succeeding crops, and stand much longer without healing. Those of the last crop fade off in the papular stage and seldom run to maturity.

It is not easy to say how the eruptions originated, but, viewing the history of the case as it is, it may not be unlikely that the disease might have been brought by contagion either directly or through some medium. The existence of a mother sore previous to the appearance of the eruptions is evident.

The eruptions are all alike in character and are decidedly tubercular.

There are no ulcers in the literal sense of the word, but there are only tubercles of every shape and size. The largest of the tubercles have, as above noted, a long diameter of over half an inch. The clean surfaces of the tubercles are pale yellowish in colour, hard and indurated in consistence, much raised above the surrounding skin, and attended with a scanty lymphy exudation. They are covered with a very thin scale or crust which takes a long time to peel off. The removal of the scale does not materially diminish or alter

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the size, shape, consistence, and colour of the tubercle. They feel as hard as common warts, and are not sensitive. The scales take a long time to be replaced if the eruptions are not interfered with as by scratching, etc.

No ulcers could be discovered in any part of the body save a few pustules identical in character with ordinary itch.

There is no perceptible difference in the state of the skin except that it is scaly white in colour in some instances. The papules are dry and hard.

The mucous membrane of the mouth and throat are unaffected. The disease has neither implicated the anus, nor has it extended to any internal organ or structure.

The eruptions are confined to the epidermis, and have not gone beyond it and the capillary papillæ. There is no decided areola.

The copper colour of, and the peculiar cachexia that precedes and attends an attack of infantile syphilis, are wanting. The disease is limited, as above noted, to the skin. Unlike syphilitic eruptions, it is remarkably raised above the surrounding skin. It runs its course with scanty exudation of lymph. There has not been the slightest destruction of tissue, neither is it a gangrenous form of inflammation.

4th Case.—Illustration No. 4 b. Mihintalai.

Reported by Mr. A. Appavupillai.

1. Punchirála, a male sucking infant of the farming class of the Siṇhalese race, aged three years.

2. A native of Karadikulam in Kananthara-kóralé 3. The date of attack was March last. The disease has stood three months or so before inspection, and the child's health is good. 4. This is the first attack. 5. This is the primary form and of the tubercular kind.

6. The family consists of four people including the parents, the infant being the youngest of the lot. The child's elder sister was attacked by the disease at the age of four.

7. The knees were both of them swollen about seven days previous to the appearance of the eruption. The parents are not aware of any scratch or abrasion in the originally affected locality.

8. There was but one infant in the village affected with a similar disease. 9 The disease is usual among infants of the age. They do not know to what cause to attribute the disease.

10. The child never suffered from any form of venereal. 11. Was never vaccinated. 12. Mother's milk and about three or four ounces of rice are the child's diet. 13. The people live on rice since January last.

14. No treatment was had recourse to, and no mercury was ever given to the child.

15. History of the case, &c.—The little patient is fair-looking, is in good health, and of a nervous temperament. The child had a small pimple or papule at the posterior aspect of the right knee-joint, which came in seven days after the swelling of the knee-joints. No other symptoms preceded, accompanied, or followed the appearance of the eruptions.

The disease may be divided into three stages for convenience of description: viz., the papular stage; the stage of enlargement or maturity; and the healing stage.

(a) The first stage lasts from four to ten days, by which time the papules enlarge and extend.

(b) The stage of maturity lasts two months and over; a good many of the eruptions have lasted three months, but have not as yet healed. The disease might stand five or six months, and might even extend to years.

(c) The healing stage also varies. It may last two, three, or four weeks.

There was no itching at the commencement, but there is a good deal of it at present, and there are marks of scratching.

The popliteal space and the face are the chief seats of the disease. The parents are not aware of any scratch or excoriation prior to the appearance of the eruptions.

The patch of eruptions in the popliteal space is about one by one-sixth of an inch in size and of a dark colour. The eruptions on the eyebrows, eyelids, and cheeks are of the same colour, and are healing. Some of these are single. The largest patch of eruption is to be seen in the lower lip covering its whole extent and even extending over the upper lip, and is of a pale yellowish colour and semi-circular in shape. The eruptions came in "successive crops," and they are all hard and indurated, alike in appearance, and are tubercular. The patch in the lower lip is tuberculo-vesicular.

The localities of the eruption are the face, buttocks, legs, and shoulders. Their number, size and shape vary. The exudation is lymphy, and the crusts pale yellowish.

The patch in the labial border is moist, not so much from the exudation as from the incessant flow of saliva. Those in the other situations are dry and have a scanty exudation.

The disease is limited to the epidermis, and hardly extends beyond the true skin or *derma*.

The skin where the eruptions are situated is scaly white

There is neither cachexia nor any morbid state of the constitution. The disease is confined to the skin. No other structures are implicated during the progress of the disease. The scars are decidedly black. There is no destruction of tissues, the skin being in a state of hypertrophy, as it were, in the localities of the eruption. The eruptions are much raised above the level of the surrounding skin; those in the lower lip less so.

The disease runs its course attended with very scanty exudation of lymph and heals spontaneously in course of time.

5th Case.—Illustration No. 4 a. Matale.

Reported by Mr. H. A. Moraes.

Janishamy; a Sinhalese lad about eighteen years old; was admitted into the Mátalé hospital on the 9th May, 1879. His occupation is that of a cultivator; he is fairly well built and is of a sanguine temperament; he was born at Galvalla, a village near Mátara, where his parents and relatives are at present living. He states that he has seen several persons in this village who were suffering from Parangi disease in the form of sores on the soles of their feet. Two years ago he suffered from fever, which laid him up for six months; and with the exception of this, his health has been very good. His parents are living, and enjoy good health; they have never suffered from Syphilis or Parangi. He has three brothers and one sister living; these also have not had Parangi or any kind of skin disease. One brother died when he was three years old.

Four months before the late Sinhalese new year he came to Moralavella, a village near or in the Vanni district, on a visit to his uncle. He remained here about three weeks and then went to Gongawella near Matale, where he remained about four weeks. From here he went to another village named Kadavella where he remained seven weeks, and then came into hospital; he travelled from his village very nearly the whole way on foot. Soon after leaving his village, he felt pains in his feet, and the left foot began to swell, the cuticle became thickened and subsequently peeled off. When he arrived at Moralavella his feet were painful, and the cuticle still much thickened He continued in this state until he went to Kadavella. While here, in addition to the pain, he felt as if "maggots were biting him" in several places on the soles of his feet. This feeling continued for about a month, during which time he was treated by a Sinhalese doctor who "fumigated" the soles of his feet. He states that the skin then "burst" and the "flesh" projected in the places where he felt the "biting" sensation.

On admission into hospital there were several small peculiar-looking sores on the soles of his feet. The largest of these was about half an inch in diameter. They were, for the most part, circular. The edges were sharp and looked as if the thickened cuticle was punched out into holes. In the middle of each of these "holes" was a protuberance which looked like a fungoid growth. It seemed to be composed of a bundle of fibrous tissue close together, and resembled the nap of velvet, but much harder and about one-sixth or one-seventh of an inch long. Under the microscope it presented the characters of fibrous tissue. Between this "growth" and the edge of the sore was a deep sulcus. The "growth" stood out prominently from the surrounding tissue. These sores were very painful. Solid nitrate of silver was applied to them, which removed the pain, and he was given iodide of potassium internally.

6th Case.—Illustration No. 5 a & b. Dambulla.

Reported by Mr. S. B. Perera.

Name, Ukkurala; age, 25; sex, male; occupation, cultivator; description, Sinhalese; birthplace, Palutawa; date of attack, about twenty years ago; duration of disease, twenty years; form of disease, ulceration and sanious discharge from the nose ("Pínas Rógé"—පිනස් රෝග).

Members of the family affected.—Parents and four brothers and sisters all suffered from Parangi; almost all the inhabitants of the village suffered at one time or another. Never vaccinated. Food, kurakkan especially, and rice now and then.

Patient states that when he was a small child about five years of age, had eruptions of Parangi ("Hamas hori" - ඕස් - හොරි), preceded by an ulcer on the outer aspect of the upper third of the right leg. He had three successive crops of eruption, with which he suffered for three years. Was free from any disease for about four years, then he began to suffer from pain all over the body, particularly along bones. Several abscesses appeared, and being opened formed into ulcers. Since three years began a sanious discharge from his nostrils, and the bridge of the nose became flattened. Denies ever having had venereal

At present the patient suffers from sanious discharge from his nostrils. Septum being destroyed, the nose has become quite flattened. On pressure, complains of pain just at the middle part of the nose. On examination, an ulcer could be seen inside of it. Hard palate along the mid-groove ulcerated, and just at the middle to its right side there is a small hole resulting from ulceration. Throat relaxed. When the patient washes his mouth, water comes through the nostrils. In both the legs below knees there are a number

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of ulcers of long standing ; they are from six by two inches to a-half by a-quarter in size. Edges raised. Surface covered with minute ruddy granulations. Secretion watery. Surrounding parts indurated. Patient complains of severe pain along bones, especially at nights. Skin dry. No enlargement of any glands in the groins.

7th Case.—Illustration No. 5 c & d. . Dambulla.

Reported by Mr. S. B. Perera.

Name, Appurála ; age 35 ; sex, male ; description, Siṇhalese ; occupation, cultivator ; birthplace, Bintambura ; date of attack, 30 years ago. Duration of disease, 30 years ; physical condition weak and cachectic : first attack ; form of disease, ulceration and purulent discharge from the nose. "Pínas Rógé"—පිනස් රෝගේ.

Members of the family affected : a brother of his suffered from Parangi. Almost all the inhabitants of the village suffered at one time or another ; had an ulcer previous to appearance of eruptions ; vaccinated ; food, kurakkan and rice ; had native treatment ; was treated with mercury.

Patient states that when he was a child about five years of age, suffered from eruptions of Parangi preceded by an ulcer on the under-side of the lower third of the left leg. About ten years ago he began to suffer from severe pain along bones, and this continued for about six months, when a sanious discharge began from his left nostril ("Pínas Rógé" පිනස් රෝගේ) accompanied by very severe pain. About a year after several nodes ("Etapola Rógé" ඇටපොල රෝගේ) appeared on his body : one on the forehead, two on the left tibia, one on the right tibia, and one on each ulna. These gradually became larger and larger, and softer and softer, till they burst and formed into ulcers. From these the patient suffered for a good long time, and had every sort of available native treatment without the least beneficial result.

At present, the patient has an ulcer on the outer side of the right elbow-joint about 3 by 2 inches in size, half an inch deep in one place where it seems to have communicated with the joint. The ulcer is irregular in shape, edges ragged, surface covered with large flabby granulations, secretion purulent and fetid, surrounding parts indurated ; lower extremity of the humerus and the upper extremities of the ulna and radius very much enlarged, giving an unsightly appearance to the elbow joint ; left side of the nose ulcerated, and a hole has formed between the bony and the soft part, and there is a fetid purulent discharge continually through this ulcer ; throat inside to its right pillar quite ulcerated ; complains of severe pain in the nose, and when the patient takes any liquid, a portion of it comes out through the nostrils. Patient complains of severe pain along bones. No enlarged glands about the groins.

8th Case.—Illustration No. 5 e. Dambulla.

Reported by Mr. S. B. Perera.

Name, Tiri Hamy ; age, 18 ; sex, male ; occupation, cultivator ; description, Siṇhalese ; birthplace Padeniya ; date of attack, about eight years ago : duration of disease, eight years ; physical condition, weak and cachectic ; form of disease, ulceration.

Any other member of the family affected, yes, four in all. Vaccinated previous to appearance of eruptions, but did not take effect.

Patient states that when he was ten years of age suffered from eruptions of Parangi (පරංගි) preceded by an ulcer on his left leg. These eruptions were cured after about ten months under native treatment. From this time patient began to suffer from ulcers on his legs and elbow joints.

At present there are several cicatrices on his right elbow and some on the left wrist. In both the lower extremities from the knees down to the feet there are numbers of cicatrices. On the lower half of his right leg there are a number of small ulcers, and some on the inner side of the left ankle. One on the latter place is about an inch in length, ½ an inch in breadth, surface smooth and covered with bloody discharge, edges raised, surrounding parts hard, both the tibia enlarged ; skin of the patient dry and looks ugly ; complains of severe pain along bones ; denies ever having had venereal ; no enlarged gland about the groins.

9th Case.—Illustration No. 5 f. Dambulla.

Reported by Mr. S. B. Perera.

Name, Menika ; age, 60 years ; sex, male ; occupation, washerman ; description, Siṇhalese ; birthplace, Moragaswewa ; date of attack, 55 years ago. Duration of disease, 55 years ; formation of disease, ulceration and deformities.

Members of the family affected ? – Every one, three in all. Almost all the inhabitants of the village suffered from this disease at one time or another.

A cachectic old patient of bilious temperament, admitted into hospital on the 25th day of May, 1879, suffering from Parangi.

Patient states that when he was a boy about five years of age suffered from eruptions of Parangi (පරංගි) preceded by an ulcer on the inner side of the lower third of his left leg. These were cured in about six months under native treatment, and was free from any disease up to 15 years since. About fifteen years ago was attacked with severe pain along bones and joints, and suffered from it for about eight full years without an appearance of a node or abscess. Just at this time his left ulna and radius got dislocated at the elbow-joint internally and were drawn upwards, the lower extremity of the humerus with articular ligaments being quite destroyed. About a year after an abscess formed on his left leg and resulted in a very large ulcer, and within a few months several abscesses formed in different parts of his body resulting in ulcers. From this time up to date he was never free from ulcers.

At present there is a larger tumor on his left elbow, caused by dislocation of radius and ulna inward and upward, the lower extremity of the humerus destroyed, and the humerus is fully two inches shorter than its fellow of the opposite side. There is a cicatrix on the inner side of the tumor, and a sinus behind communicating with the joint. In the lower part of the left fore arm there is a large cicatrix about three by two inches in size. It is brownish, yellow colour, and puckered up. Power of motion of this extremity is very much impaired. Left knee very much swollen, and there is a sinus communicating with inside of the joint. On the middle third of left leg in its anterior aspect there is an ulcer of six months' standing. It is four by three inches in size, surface covered with flabby granulations, secretion limpid, edges raised and hard, surrounding parts indurated.

Skin of the patient dry; complains of severe pain along bones and especially at nights; denies ever having had Syphilis; no enlarged glands in the groins; no ulceration of throat.

10th Case.—Illustration No. 6. Dambulla.

Reported by Mr. S. B. Perera.

Name, Menika; age, 35; sex, male; description, Sinhalese; occupation, cultivator; birth-place, Emmalawa; date of attack, about 34 years ago; duration of disease, 34 years; physical condition, emaciated cachectic; first attack; form of disease, ulceration and deformities. Parents suffered from Parangi; almost all the inhabitants of the village suffered from the disease. Had no discontinuation of skin previous to appearance of eruptions; never suffered from any venereal; never vaccinated; food, kurakkan and rice; had native treatment, was treated with mercury.

Patient states that when he was an infant had eruptions of Parangi. About 15 years ago, after a severe attack of fever and pain all over, he was bedridden with a number of ulcers formed in different parts of his body. From these he suffered for several years, and had all sorts of native treatment available; when some of the ulcers were healed, some others appeared, and within these 15 years his extremities became a continuous mass of cicatrices. His hands became deformed with loss of flesh, and the joints of fingers anchylosed. Both the feet deformed into *Talipes equino-varus* Hands near the wrist and legs near the ankles appear like pieces of sticks covered with shining leather.

At present there are a number of ulcers situated on the legs and feet; those of the latter are sinuses communicating with dead pieces of tarsal and metatarsal bones. Ulcers are small, irregular and concave, edges raised, granulations small and very tender, secretion purulent and offensive. Patient complains of severe pain, and is very restless at nights; skin dry; no ulceration in the throat.

11th Case.— Illustration No. 7. Dambulla.

Reported by Mr. S. B. Perera.

Name, Ukkurala; age, 4 years; sex, male; description, Sinhalese; birth-place, Padeniya; date of attack one month ago; duration of disease, one month; first attack, form of disease, eruptions.

Any other members of the family affected?—Both the parents suffered; his elder sister never. Had an ulcer on the inner side of his left ankle previous to appearance of eruptions: vaccinated previously; never had any treatment.

Father of the patient states that about three months since the patient suffered from an ulcer on the inner side of his left ankle caused by an injury he received; about a month ago an eruption appeared on the right side of the base of the neck, and a few days after one about an inch above the left ear, one over the upper part of the posterior side of the left parietal bone, and another on the occipital bone appeared; since two days four on the chin, two on the left cheek, two on the forehead, and two about half an inch in front of the right ear appeared; an eruption on the prepuce of the penis appeared about a week since. Both parents deny to have ever suffered from any venereal.

At present there is a large very unhealthy ulcer on the inner side of the left ankle. It is somewhat larger than a five-cent piece in size, surface raised and irregular, granulations large and flabby, edges hard, secretion purulent and offensive. The ulcer is

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surrounded with a halo of bluish dark skin. All the abovementioned eruptions are existing, and those of the base of the neck, scalp, and prepuce are raised, tubercular, round, and about the size of a pea each ; their surfaces are covered with a small scab, and on removing this exposes a part with minute granulations covered with a thin glairy fluid which in a few minutes form into a hard scab. Rest of the eruptions are very small, papules only ; skin of the patient moist and looks normal. Complains of severe pain in his ulcer, but nothing in the eruptions. Appetite good. Sleeps well.

12th Case.—Illustration No. 8. Dambulla.

Reported by Mr. S. B. Perera.

Name, Menicky ; age, 30 ; sex, female; description, Sinhalese ; birth-place, Padeniya ; date of attack, about 28 years ago ; duration of disease, 28 years.

Physical condition, cachectic ; formation of disease, ulceration and deformities. Any other members of family affected ?—Father suffered from eruptions of Parangi and no ulcers ; mother suffered from both. Has two children, and elder child suffered from eruptions about six years ago. In the village almost all suffered from the disease ; had no abrasion of skin previous to eruptions ; vaccinated, but did not take effect ; ordinary food, kurrakan and rice ; had native treatment, and was treated with mercury.

Patient states that when she was a small child about two years of age had eruptions of Parangi without any discontinuity of skin previously. These were totally cured under native treatment in about eight months, and was free from any complaint up to seven years since. At this period the patient was attacked with severe pain all over the body accompanied by high fever, and in the course of few days several abscesses appeared in upper and lower extremities. These being softened and opened, formed into several large ulcers ; those of the upper extremities healed in about three months under native treatment, without the occurrence of any deformity except that of the right little finger, which, having had an abscess on the outer side of its base, got deformed, the bone being fractured. The ulcer on the lower extremities remained for about five years, causing great destruction to the tissues, and in consequence both the legs and feet got deformed. Since, on the cicatrices of the lower extremities there appeared a number of ulcers ; when some begin to heal some appear · Since three months the patient is unable to walk without the aid of a stick. All throughout these seven years the patient suffered severely from pain along her bones, and consequently her system was reduced a great deal. Denies ever having had venereal.

At present there are five large cicatrices on the left and one on the right upper extremity. They are from 5 by 4 inches to ½ in. by ¼ in. in size ; shape irregular and puckered up: colour brownish yellow, and state very dry; the right little finger deformed, and its power of motion is very much impaired.

On the lower extremities below the knee there are several ulcers formed on the bases of former cicatrices. On the left leg from about an inch below the knee to two inches above ankle there are thirteen small ulcers, all situated on the anterior side, little to its outer aspect, and two on the dorsum of the foot. These are from a cent-piece to half a pea in size, their surfaces concave, edges raised and hard, granulations very small, secretion in some yellowish and in some bloody ; surrounding parts red, shining, and hard. On the right leg from its middle third down to the foot there are about nine small ulcers. Most of them situated on the edges of former cicatrices. One ulcer on the inner aspect of the middle third of the right leg is about ½ in. by 1 in. in size, and the rest are all small, being about half-a-cent-piece in size each. The surface of the large ulcer irregular and covered with flabby granulations and brownish yellow pus ; that of the rest appear as it were excavated ; edges of all raised ; surrounding parts hard.

Left foot is doubled up as it were, and deformed into Talipes equinus. In this foot she is able to move her little toe only at her option. Lower third of the left leg is bent inward, and looks something like a round piece of stick covered with a leather ; whole of the leg covered with cicatrices ; there is one cicatrix above the left knee of about four by three inches in size. Its characters are like those on upper extremities. Second toe of the right foot is deformed, and it appears as it were drawn down backwards or an offshoot from the dorsum of the foot. There is a very tough cicatrix running backwards from the root of this toe. On walking the patient is unable to rest her heel of this foot on the ground, and says that she feels that part shorter. The skin of the patient dry ; no ulceration in throat or soft palate ; complains of pain all over the body. Sleeps well.

13th Case.—Illustration No. 12 a. b. & c. Kurunegala.

Reported by Mr. T. F. Garvin, M. B.

1. Lapayah ; 14, male, Sinhalese, cultivating chenas.
2. Rambawane, Mitualla Mahagalbodda-korale, Kurunégala.
3. Two years ago. Good.
4. Fifth attack.
5. Primary Rupia-like crusts.

6. His mother and brother have both had Parangi; his younger brother brought it into the family.

7. He had an ulcer on the left outer ankle, and when that healed the eruption appeared.

8. All the people in the village have the disease.

10. No.

11. Vaccinated. Long after.

12. Kurakkan, rice now and again, about a measure a day.

13. The same as above.

14. Was treated four times before in this hospital, and always left nearly well—*i. e.*, with one or two immature eruptions. Yes.

15. The subject of this report, a healthy, well-made Sinhalese boy, about 14 years old, is admitted for the fifth time suffering from Parangi.

The lad is cheerful, bright-eyed, active, and fairly intelligent. He is a docile patient, and fully appreciating the virtue of hospital treatment; takes an active part in his own as well as in the treatment of others similarly affected.

His past history is thus related by him:—

"Our family consists of my mother, younger brother and myself. We live in a village called Rambawane, which consists of about half-a-dozen houses built close to each other. There are about four persons, on an average, residing in each house. Almost all the people are suffering from some form or other of Parangi, but most of them from the kind I have on me.

"There is a tank in this village, the water from which we use for cooking, drinking, &c., and we bathe and wash all our things in it.

"The tank is a large one, and overgrown with reeds. About four years ago my younger brother got a sore on his left shin from scratching. This sore got well in due course, and shortly after he became covered with this kind of eruption. In about eight months he got well, and he is now quite well and strong.

"Next my mother got the disease. (My father died about six years before this, and I recollect being told he also suffered from Parangi.)

"Long after my mother got well I felt an intense itching over my left outer ankle, and scratched it till it bled and formed a sore. The sore was long in healing under native treatment, so I came to this hospital and was cured in about a month and a-half.

"I went away cured, but before long I felt feverish and had pains in my joints. This lasted about fifteen days, and then about half-a-dozen pimples appeared around the cicatrices on my ankle. Then a fresh crop of eruptions came out on my face. I came into hospital and remained two months. I was so much improved that I left again, with but one or two solitary pimples on my body. In a month the eruption came out fresh, and I returned to hospital. This occurred about four times, and I come in now for the fifth time. When I am in my village, I take part in cultivating chenas, growing mostly thanahâl and kurakkan."

His present condition is as follows:—There are three distinct crops of eruptions of the ordinary Rupia-like kind: the oldest on the nates, the next on the arms and legs, and the last on the face. There is a good deal of symmetry in the distribution of the eruption, the patches on the nates particularly. The patches are very irregular-shaped, and the individual eruptions distinct, *i. e.*, separated from each other by healthy skin. On the nates the individual eruptions are largest and most matured. They are nearly circular-shaped, raised by about a-quarter of an inch over the level of the surrounding skin, yellowish-brown in colour, firmly adherent, and in some instances having a subdivided, irregular surface as in a warty growth. The crusts are dead to sensibility. The points of the knife could be driven into them without causing the slightest pain, which is however felt directly the subjacent healthy sore is touched. Some of the eruptions are healing. On removing one or two of the shrunken crusts a healthy sore was reached, the surface of which was irregular from projecting granulations resembling hypertrophied papilla, and very sensitive. The eruptions on other parts present the same appearances, but not so clearly. On the face there are some eruptions just being evolved. The first appearance of the eruptions is as in ordinary acne, but no proper pustule ever forms, nor do they yield comedones on pressure being applied. On the contrary the apex of the papule becomes discolored and rough from desquamation of the epithelium at this point. In the next stage an exudation occurs at the apex of the papule and the whole papule enlarges and becomes more prominent. The eruption here aborts and only desquamation with subsidence of the papule occurs, or a further enlargement ensues, and a true crust of a dirty yellow colour forms by separation of the prominent part of the papule from the healthy skin.

Skin.—Beyond the eruption, the lad complains of nothing. There is no loss of flesh, fever, loss of appetite or malaise. There is a good deal of itching in and around the eruptions. The evolution of the eruption was in three successive crops, with an interval of a week between them. The skin generally is quite healthy, but slightly dry and rough. The lad states distinctly that no person with Parangi touched the initial sore, that when he was in hospital a great many cases of Parangi occupied the same ward as he, and that he never handled a Parangi sore himself.

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Treatment.—The patient was treated with perchloride of mercury internally, and the nitrate of mercury ointment externally. He continued to improve very slowly, but after he was vaccinated there was a marked and rapid improvement in his condition. The patient exhibited all the symptoms of vaccinia, and two excellent vesicles formed at the points of inoculation with lymph. The treatment by mercury was continued during this period and subsequently.

14th Case —Illustration No. 10. Kurunegala.

Reported by Mr. T. F. Garvin, M.B.

1. Punchimenika ; two years ; female ; Sinhalese ; nil.
2. Talawitigemuwa, Dewameddi-hatpattu.
3. January, 1879 ; three months ; very good.
4. First.
5. Primary condyloma-like eruptions.
6. Yes ; four. First, an elder brother ; then the mother ; then one of the mother's two husbands ; and last, the patient.
7. After the healing of an ulcer on the right leg.
8. No ; only a few people have the disease.
9. Contagion.
10. No.
11. No.
12. Milk, but takes rice and kurakkan.
13. Rice.
14. Nil.
15. The subject of this report is an exceedingly well-made little girl, who looks the very picture of health but for the eruptions on her body. She is the youngest child in a living family of five. She has lost five of her brothers and sisters. According to the mother's statement, these five children died of fever, diarrhœa, etc., and not from any obscure or chronic disease, which first declared itself at or shortly after their birth. The mother has two husbands, who are themselves very closely related, being sons of the same father by different mothers. The mother is a strong and comparatively young woman. The first person who took the disease in the family was an elder brother of the patient. He contracted the disease by frequent association with the children of the adjoining villages who are notoriously Parangi afflicted. He had a different form of eruption, viz., the rupia-like crusts. After six months' treatment with preparations of mercury he got quite well, the last traces of the disease having been eradicated by the treatment he received at this hospital. He is now quite well ; and a strong well-made lad. The mother of the patient was the next to contract the disease, and in her case, too, the variety was the rupia eruption. She is now quite well, and an exceedingly fine specimen of a Sinhalese matron. A few of the pigmented scars are visible here and there on her back. The next in the family was one of two husbands, but whether in his case the eruption was of the rupia-like or condyloma-like kind is not ascertainable. The subject of this report then took the disease, presumably from the father, as he used, while still covered with the eruptions, to carry the child about and feed her off his own plate. The child first made a sore on the outside of the right leg by scratching violently, and it took nearly a month before the sore healed. Directly the sore healed a crop of eruptions appeared on the nates and in the *cleft* between them, then the backs of the thighs, the belly and the face became affected. The evolution of the eruption was preceded for a few days by slight fever and peevishness. This is the history which the mother gives regarding the origin of the disease in her child. She states that she had quite recovered of her attack of Parangi before this child was born—nay even before she was conceived. She states that both her husbands were quite healthy men, that they did not suffer from any venereal disease as long as she knew them, and that she never herself suffered from any such disorder or lost any children by miscarriage or from any venereal disease. When admitted into hospital the child was covered with eruptions of the moist variety. About the middle third of the outer side of the right leg there was a dense reticulated cicatrix, which occupied the site of the initial sore. The eruption appears to have been evolved in three distinct crops, the first on the nates and backs of the thighs, the second on the belly and chest, and the third and latest on the face. The first crop of eruptions was distributed in a nearly symmetrical manner, and consisted of single elevated sores covered with a dirty yellow moist scab. Each individual sore presented a perfectly healthy granulating surface when the scab was removed. The scab was perfectly insensible. It adhered very slightly to the subjacent sore. The next crop of eruptions was on the belly, and presented nearly the same characters as those on the nates described above. On the face there were a few moist eruptions and some acne-like eruptions. There was no induration at the basis of the eruptions.

The general health of the little patient is excellent. Her teeth are well-shaped and firmly set. She cries a good deal owing to the pain produced by the constant friction in the region of the nates. The skin, where unaffected, is perfectly normal and

possesses the usual gloss, feel, and elasticity of healthy skin. The sweat glands work normally. The patient takes her food well, and there has been no appreciable loss of flesh since she contracted the disease.

The patient was first treated with powders containing sublimed sulphur and cream of tartar and a local application of carbolic acid oil, and, as she shewed no signs of improvement, she was ordered calomel and Dover's powder and the local use of dilute citrine ointment. She improved rapidly under this treatment, and most of the eruptions commenced healing over and leaving pigmented cicatrices to mark their site.

When I left Kurunégala the patient was fast convalescing.

15th Case.—Illustration No. 9 b. Kurunegala.

Reported by Mr. T. F. Garvin, M.B.

1. Punchihamy; 30; female; Sinhalese; engages now and again in paddy and kurakkan cultivation.
2. Doratiyagedara, Hetahaya-kóralé, Kurunégala District.
3. March, 1878; six months; bad; a very thin, dirty and slovenly woman.
4. First.
5. Primary rupia-like crusts
6. Yes; two: (1) the baby at the breast, (2) the mother, Punchihamy, and (3) the other child.
7. The disease commenced as a sore on the right breast, which the baby, who had the eruption round its mouth, took frequently. The breast was quite sound. There was no fissure or scratch.
8. Yes; a great many. There are fifteen houses in the village, and half of these are infected.
9. Contagion from the child.
10. No.
11. Yes; the disease came long after.
12. Thirty ounces of rice per diem; eats some kurakkan only in the mornings.
13. The same as she takes.
14. Was for thirty days under native treatment, and took "alla baith," but not mercury.
15. The subject of this report is the mother of five children, of which three died shortly after their birth. She has now two children alive—one male, and one female, one about two years old, and the other still at the breast. She is a little spare woman, very thin, dirty and slovenly, and of a nervous temperament. She is about thirty years old, and a Sinhalese, born and bred in Kurunégala District. Her occupation consists in now and again lending a hand in the cultivation of paddy fields and in taking in crop. She has never had anything the matter with her before. Her husband is a healthy man.

About eight months ago her child, the one at the breast, contracted Parangi from one of his playmates, and the eruption appeared well developed round and about his mouth. The eruption was partly of the rupial and partly of the condylomatous character. The woman, unmindful of the consequences, although she was well aware what they were, permitted the child to take the breast as usual. After a time, a boil, as she calls it, developed about the nipple, broke, discharged matter, and ulcerated. The sore eventually, after a course of native treatment, healed, and its place is now occupied by a large dense cicatrix, which by its contraction has deformed the breast. The boil was so painful that she had to prohibit her child taking that breast since. She took no mercury, but what is known as "alla baith," probably China-root (Smilax China). It took the sore three months to heal over, and directly this was accomplished a crop of eruptions appeared on the face, preceded by slight fever, loss of appetite, malaise and pains in the larger joints for a day or two. When received into hospital, there were a few dark spots in the forehead and back of the neck, and three distinct crops of eruptions on the face, body, and arms and legs. That on the body was of the shortest duration, as no scars were observable there, and as several flesh eruptions were being evolved. The eruption presented the following naked-eye appearances, and was attended with a good deal of tingling and scratching.

There was no method in the distribution of the eruption on the face, body, legs or arms. In some spots the eruptions were confluent, while at others a considerable portion of healthy skin intervened; on the face, where the eruption was oldest, the crusts were quite dry, nearly round in shape, dark-coloured, and easily removable. On the chin there was a very prominent eruption, the crust of which resembled a horny growth. On removing the crust, a healthy sore, the surface of which was red and uneven from prominent granulations, was exposed, and just a drop or so of lymph-like substance exuded and spread over the sore.

On the arms and legs the crusts were of dirty brownish-yellow hue, moist, firmly adhered, and of great density. A few dark-coloured spots were also observed, mostly depressed below the level of the surrounding skin, and irregular in shape. In some instances, continuous with the dark discolored patch, there was a slightly raised yellowish crust

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which, looked at from a slight distance, appeared as if the cuticle were there elevated by purulent matter.

On the back there were no dark spots, but the young eruption, looking like acne roughly handled, diffused in the most irregular manner. Some of the youngest eruptions were no more than simple papules with a little roughening and discoloration of their apices; others were appreciably raised above the surface, and had a moist and yellowish colored apex, as if from desquamation of the epidermis. There were no pustules. The skin generally was dry, rough and somewhat scaly, as in the desquamative stage of measles. There was a considerable amount of dandruff on the head. The body appeared as if dusted over with bran. The skin was rough and dry.

N.B.—In the child, a few crusts existed over its body, and the eruption round the mouth was confluent, irregular-shaped, and crusted over in the greater part of its extent. It looked very like an attack of *Herpes labialis*, which had been roughly handled and had ulcerated and *scabbed*.

The elder of the two children had the eruption in the same stage as the mother, and its appearances were the same. The mother and her children were treated with the local use of dilute citrine ointment rubbed on after bathing in warm water, and the internal use of mercury in the shape of the perchloride. All three were rapidly improving under this treatment.

16th Case.—Illustration No. 1. Kurunegala.

Reported by Mr. T. F. Garvin, M. B.

1. Pakeer Tamby; 48; male; Moor; cultivator.
2. Wallathava, in Vanni Wallathava.
3. About October, 1878; about four months; fair.
4. First.

5*a*. Primary soft eruptions.

6. Yes: (1) his brother, (2) his mother, (3) his child, and (4) himself.
7. From a scratch on the neck.
8. Yes; a great many, nearly all.
9.
10. No.
11. Vaccinated; after.
12. Mostly kurakkan.
13. Ditto.
14. Nil.
15. The subject of this report is a strong made Moorman, born and bred in Vanni district. He is about sixty years of age, and was twice married. His wife gave birth to two children a girl and a boy—and died. She never had Parangi, and she died of fever. Both the children are quite well, and have never had Parangi. His second wife is still alive. By her he got four children—two girls and two boys. He has had his second wife for more than ten years, and she developed Parangi a few months ago, and after the patient. The last child by the second wife was the first in the family to develop the disease, and it was from her that the patient caught the disease.

About fifteen years ago, one of the patient's brothers got Parangi disease, and three years after that his mother contracted it. Both of these are now quite well, and have not so much as a sore on their bodies. About six or eight months ago the last child of the patient contracted the disease by playing with other Siṇhalese children afflicted with the disease, and the eruption that broke out was of the moist condylomatous kind. The child was treated by a vedarála, but is yet not quite free of the disease. When the child had the disease, the patient used to carry her about and feed and attend to her generally. About six months ago, the patient made a sore on the left side of the neck by scratching a pimple which came out there. The sore got well in about fifteen days, though he took no medicine for it. Just as the sore was healing, he got what he considers an attack of fever attended with pain in the large joints and back. This attack went on for about four days and then subsided, but on the third day following he observed the eruption coming out on the right side of the neck first, and then over the body. The eruptions appeared as little pimples which were accompanied by slight pain, but intense itching. Then each individual pimple enlarged and formed an eruption.

There was no marked interval between the appearance of the first and second crop of eruptions, and there were no premonitory symptoms preceding the second crop.

The village Vallathuva, in which the patient resides, is in the Vanni districts. It consists of about twenty houses, each of which accommodates on an average about seven people. The houses are in blocks, three or four houses going to one block. There is always a garden intervening between the blocks. The people freely associate with each other, and are most of them Siṇhalese, though there is a pretty large number of Moors also.

The village is a poor one, and the villagers gain their living by chena and paddy cultivation. The staple article of diet is kurakkan, and rice is a luxury they seldom

enjoy. There is a great deal of Parangi in the village. The villagers have plenty of cattle, and they eat curd made of buffalo milk very freely.

There is a tank in the village which supplies the villagers with water for drinking, cooking, bathing, and washing. There are a few wells, but they are seldom used, as the tank, which is a large one, supplies all their wants.

He has not tasted meat in any form oftener than once in about eighteen months; his usual diet consisting of kurakkan and vegetables. When admitted, the man had two different kinds of eruptions—*i. e.*, the condylomatous, and still another in which each individual eruption seems to heal in one direction and extend in another.

There was one large eruption on the left side of the neck by the side of a dense, pale cicatrix, and another on nearly the corresponding part of the opposite side of the neck. These eruptions were somewhat oval-shaped, the long diameter being parallel with the axis of the neck, distinctly raised above the surface and covered over by a thin dirty yellow scab, which was quite moist and removable, and bearing a striking resemblance to some yellow paint. On wiping off the scab with a piece of cloth, a granulating ulcer was exposed which appeared quite healthy. On the face there were three or four well-marked eruptions; on the forehead, between the eye-brows, there was one eruption which was quite healed towards the right, but which seemed to be extending towards the left; this latter portion looking as if the skin was raised by some matter underneath. On the chin there was a large irregular-shaped eruption from the base of which several healthy hairs stood out. A similar eruption occupied the middle of the upper lip, and a portion of the right wing of the nose.

On the inner side of both upper arms there were four eruptions of the moist kind, and another large one on the posterior edge of the right armpit.

In addition to this, there were several eruptions on the penis and scrotum. In the latter they ran together and formed a large irregular-shaped sore covered with a thin, moist, dirty, yellow scab.

In the cleft between the middle and ring finger of the right hand, there was one eruption which, like the rest, looked more like a condyloma than a rupial crust.

The throat was carefully examined. The fauces and pharynx seemed normal, but at the base of the tongue, among the circumvallate papilla, there were two ulcers exactly like the eruptions on the body.

The treatment in this case consisted of the exhibition of perchloride of mercury internally, and the ointment of nitrate of mercury externally. The patient was fast improving under this treatment.

17th Case.—Illustration No. 9 a. Kurunegala.

Reported by Mr. T. F. Garvin, M. B.

1. Mudiyanse ; 10 ; male ; Sinhalese ; nil.
2. Uhumea.
3. December, 1878 ; two months ; very good.
4. First.
5. Primary rupia-like crusts.
6. No.
7. From a sore. The result of scratching.
8. None at all in the village.
9. —
10. No.
11. Not vaccinated.
12. Rice ; no kurakkan.
13. Ditto.
14. Doubtful.
15. The subject of this report is a healthy young Sinhalese boy, about ten years old. He has three elder brothers, one younger brother and three sisters elder than himself alive. One sister younger than himself died when very young of convulsions. His father died a short time ago, he says, of fever. In his village, Uhumea, there is no case of Parangi, and the adjoining villages are equally free from this disease. The water used for drinking, cooking and other purposes comes from wells, of which there are about three in the village. The village consists of about twenty houses, each of them accommodating about eight persons. There are a great many outsiders who come into the village to trade, but as a rule they are healthy, and in the boy's recollection none of them had Parangi. The food generally used by the villagers is of good quality, and consists of rice and vegetables.

About six months ago, the subject of this report states that he felt an intense itching on the right leg, and that he made a small sore there by scratching. This sore became worse one day by being hurt by some brambles, and it took nearly two months to heal. While the sore was just getting well, a crop of eruptions appeared on the face, and after an interval of a week another crop of eruptions appeared on the legs and body generally. A man named Mudiyanse, a native of Vanni, but a long resident at Uhumea, had a hut built apart from the houses in the village, and the patient kept there under observation for nearly

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two months, and at the expiration of that period sent him here for treatment. This man gave the patient some powder and an infusion made with it. The powder made his mouth sore, but his symptoms were not improved.

The evolution of the eruption was preceded by malaise and pain in the larger joints; but the second crop of eruptions had no premonitory symptoms such as these.

When admitted into hospital, the patient exhibited two distinct crops of eruptions. The first on his face, and the second on his legs. A few typical eruptions were scattered about the back and belly. On the middle of the outerside of the right leg, there was the cicatrix of a sore, as large as a crown-piece. The centre of the cicatrix had the appearance of a patch of morphæa, and the edges were reddish brown in colour. On the face there were several large rupia-like eruptions, three of which, larger than the rest, were situated about the right angle of the mouth. The individual eruptions consisted of a dry, yellowish-brown scab, raised considerably above the surface of the surrounding skin and easily detached from the subjacent sore, which presented a healthy granulating surface. On removing the scab the sore became immediately covered with a thin layer of a substance like lymph which, quickly coagulating, obscured the surface of the sore. The eruptions on the legs presented the same appearances, and were attended by the same phenomena on the removal of the loosely adhering scab. The skin over the body generally seemed a little more dry than natural, but beyond this, there were no unusual appearances noticeable. A careful examination of the throat revealed nothing particular.

The mouth was sore, the gums being tumified and congested as in ordinary mercurial salivation. From what the patient states, it is difficult to ascertain whether a mineral substance was used or not; the presumption being rather the other way, for he distinctly states that a decoction made with the powder was also given him.

There were no digestive, respiratory, or urinary derangements. The urine was alkaline, and passed freely and in average quantity. The appetite was good and the bowels regular. The teeth were models of strength and cleanliness. The eyes were quite healthy,—the conjunctiva being red and vascular, and the cornea clear.

The epiphyses of the humerus were not enlarged, the joints were quite sound, the legs straight and strong, and the muscles well developed.

The head was comparatively small, and the boy rather slow of apprehension, and somewhat stupid.

Treatment and termination.—The boy was put upon calomel and Dover's powder, one and two grains respectively given every fourth hour In four days the gums became spongy and salivation well marked. The medicine was continued eleven days more at longer intervals, the mouth being frequently washed with alum and chlorate of potash gargle.

The eruptions healed rapidly, and on the 18th April—nineteen days after admission—he was discharged perfectly cured

The effect of the mercury seemed to be to dry and loosen the scabs, which then fell off or were easily picked off. The subjacent sore in many cases, where the scabs were removed, was found healed and dry, the healing being effected by the extension from the circumference to the centre of a deeply pigmented epidermis. When the boy left the site of the eruption was occupied by black patches.

18th Case.—Illustrations Nos. 13 and 14. Galle.

Reported by Mr. F. A. Vandersmagt.

1. Sadris; twenty-five; male; Sinhalese; labourer.
2. Nugadome, where he now resides—a village close to Galle within two miles.
3. In January last, *i. e.*, about five months prior to admission; patient fairly well built.
4. Second attack.
5. Primary: small papules which are said to have become converted gradually. Secondary: into larger tubercles covered with the characteristic yellowish white discharge of the size and shape as depicted in the engraving No. 13.
6. Both wife and child who were in hospital last year. The child is said to have had it first, wife next, and patient last of all.
7. Had no sore or scratch before the appearance of the disease, which, as stated before, commenced as papules on the right leg.
8. Few at present, scarcely half-a-dozen, but several, including the dhobies, who had it, have now recovered.
9. Contagion.
10. Denies having ever suffered from any form of venereal.
11. Has been vaccinated, both during infancy and after he was grown up. Disease appeared long after re-vaccination.
12. Rice occasionally, jak-fruit, yams; quantity varying from 12 to 30 oz.
13. Same amongst the poor; better classes having rice at least once daily.
14. No treatment at all in the village previous to admission into hospital.

15. This is a well-marked case of Parangi of the so-called moist variety (identical in most respects with the tubercular form of skin disease described as Frambœsia or Yaws by Drs. Bowerbank and Imray of Jamaica) in a well-built young Siphalese of a sanguineous temperament, aged about 25 years. He is of the Mahabaddé or Cinnamon-peeler caste, and by occupation a labourer.

His general health is fairly good. Besides an occasional attack of fever, does not remember having had anything serious the matter until his getting ill with the present disease which, as stated before, is said to have commenced as papules without being preceded by any constitutional symptoms.

The papules in the case of this patient do not seem to have lasted many days before the cuticle burst, and the eruption assumed the characteristic tubercular form, which on an average lasted from six to eight weeks before they dried. The patient has now been three weeks in hospital, and several of the eruptions on buttocks, abdomen, chest, face, &c., have dried up altogether, and the rest are inclined to heal.

Besides a slight burning sensation occasionally felt in the eruption, they do not seem to cause any uneasiness. Like the other variety (dry) of the disease, it is not auto-inoculable.

The eruptions in this case were, on admission, most marked about the upper and lower extremities. They are said to have commenced in the manner previously described on the right leg and foot, right knee, left leg and foot, knee and buttocks; next, right arm and hand; next, left arm and hand, face, belly and chest.

The one on the right eye-brow is the largest and most prominent of those on the face; it is nearly circular in shape, about the size of a half-cent piece, considerably raised above the surrounding skin, rather spongy, and covered with that peculiar yellowish white discharge usually seen in these cases. Those about the two knees, elbows, and hands are more numerous, and some as large as cent-pieces. In other respects they are similar to the one, on the face just described. The skin in this case is said not to have been injured in any way before the disease appeared. The area of the disease here about the extremities may be said to be more or less circumscribed: the eruption appears to have come out in successive crops, and to have originated from contagion. It may be here mentioned that the disease about the soles of the feet is slightly different from that in other parts in the eruption, being less prominent, more diffuse and rather more sensitive; the patient alludes to them as "Pooppelle." Although there was slight suppuration in this case, there was no actual ulceration, the several tubercles being covered with the characteristic discharge already alluded to, getting less and less prominent and less moist when inclined to heal, and on their healing leaving nothing but dark stains on the skin. This patient's skin presents a healthy appearance, and the mucous membrane of the mouth and fauces nothing abnormal; the tonsils are of a normal size.

From there having been no ulceration, and apparently no loss of substance in this case, there is no reason to believe that any other portion but the external layer of the skin (epidermis) was involved.

From the symptoms, &c., of cases of Parangi like the present, resembling in every respect the West Indian disease Yaws, I do not think we can be wrong in considering it non-syphilitic, but identical with the disease alluded to, or one very closely allied to it.

19th Case.—Illustration No. 15 a & b. Galle.

Reported by Mr. F. A. Vandersmagt.

Baby-hamy; 18; female; Siphalese; unmarried.

Malimbada in the Mátara District, where she is said now to reside.

Had Parangi eruptions during childhood, and the ulceration of left foot with contraction, &c., about ten years ago.

Physical condition rather thin and slightly anæmic.

(*a.*) Primary.—Papular eruptions said to have appeared about legs, &c.; these are said to have become converted into tubercles which, after the second or third attack, are said to have ulcerated.

(*b.*) Secondary.—Ulcers about the lower extremities.

(*c.*) Sequelæ.—Contraction of left foot in the manner depicted in sketch of case No. 3.

Does not remember any other member of her family suffering from either Parangi or ulcers about the extremities similar to those she has had.

Does not remember having had any sore or scratch before the Parangi eruptions made their appearance.

A certain proportion of the people in her village—*i. e.*, about eight or ten—suffer from Parangi just now, and a few others from ulcers about the legs, contractions, &c.; but a large number are said to be diseased in the Mátara district.

The eruptions are attributed to contagion and ulceration, &c., and the patients being in indifferent health and living on indifferent food at the time, they suffer from the second or third attack.

Denies having had Syphilis after she had attained the age of puberty, and there is no evidence of her having suffered from hereditary Syphilis.

Said to have been vaccinated when very young, but has no satisfactory marks. Parangi eruptions said to have appeared years after patient was vaccinated.

PARANGI DISEASE.

HISTORIES OF CASES.

Rice very seldom. Jack fruit, yams, sweet potatoes, &c.; quantity varies from 10 to 25 oz.; meat seldom or never, fish occasionally.

Same as above; the better classes are said to have a meal of rice once daily at least.

Does not remember having had anything besides a few decoctions at the commencement of her illness.

This was a young Sinhalese woman suffering from well-marked contraction of one of her feet—the left—a sequela occasionally following ulceration after an attack of Parangi. She was unmarried, aged about 18. Slightly anæmic, and of the ordinary cultivator caste. When in her village she is said to have occupied herself as women of her caste and position generally do.

Her general health was apparently indifferent. She was rather anæmic, which was due in all probability to her being a native of a village in a malarious part of the district, and where she used occasionally to suffer from attacks of ague. The Parangi eruptions are said to have been preceded by no constitutional symptoms, but when suffering from the ulcers on the legs, &c., she is said to have suffered from severe pains in the joints and bones, and which even now are said to trouble her.

The eruptions in this case seem to have undergone the same change at first as in the other cases that have been reported—with this difference, that those about the legs on the second or third attack terminated in ulceration, and eventually contraction of the left foot, as depicted in the sketch

In this case the ulcer on the dorsum of the left foot, with the characteristic contraction of the foot itself upwards, and the big and little toes inwards and upwards, was most prominently marked. This particular ulcer is said to have commenced on the inner side of the big toe, to have partially healed and broken out afresh frequently, and to have gradually spread over the dorsum of the foot, and which on shewing appearances of healing resulted in the gradual contraction of the foot that the patient has now been suffering from for several years. The ulcer as it appears at present is not large, is irregular in shape and surrounded with a whitish cicatrix. The patient has besides this, other cicatrices on the same leg (left), and others on the right leg, where she is said to have had ulcers some time ago. Her tibia will also be observed to be arching forwards in the sketch representing her case.

The patient's skin cannot be said to represent a very healthy appearance; it is rather drier and rougher than natural. On examining her throat, her tonsils are found slightly enlarged.

In conclusion, I may remark that this case fairly represents what is usually seen in persons in the advanced stage of the disease now under investigation.

20th Case—Illustration No. 16 a & b. Galle.

Reported by Mr. F. A. Vandersmagt.

1. Punchy; 18; male; Sinhalese labourer.

2. Kapugamuwa in the Mátara district, where he is said to have resided all his life.

3. Apparently some months ago, but nothing of the history of his case could be got from the patient himself, who seems idiotic and with no idea of dates, time, &c Physically he is in fair condition, although deficient in intellect.

4. Apparently a first attack.

5. Primary; similar in all respects to the case No. 18, viz., that of Sadris.

6. The patient speaks of the people in the house he was living in having the disease, but is not capable of giving further particulars.

7. The patient points to a scar on left leg where the disease is said to have commenced, apparently as a papule as in other cases, but where the eruption terminated in an ulcer.

8. People in patient's village are said to be suffering from the disease, but he cannot give any idea as to how many are affected.

9. The patient gives no reply to this question, but there could be no doubt that it is contagion.

10. Apparently not.

11. Has marks of vaccination on both arms. Said to have been vaccinated when very young. Disease appeared long after vaccination

12. The same as the poor of his district. Rice occasionally. Jack, yams, &c., in quantity varying from 15 to 25 oz. daily.

13. Same as above; better classes having a meal of rice daily.

14. Apparently none

15. This is a characteristic case of the same variety of Parangi as that described in No. 18, in a weak-minded, dark young Sinhalese man of about eighteen years of age. He is not nearly as well built as the case already alluded to, but is on the contrary of rather a slender build and slightly anæmic. He is by caste a tom-tom beater, and by occupation a labourer

This patient appears to be in the enjoyment of pretty good health, to possess very fair appetite, and not to have suffered from any serious illness. The present illness, as in the other case, is said to have commenced as a papule on the left leg, and to have undergone the

same changes as the eruption in the other case did, and latterly to have ulcerated and left the scar which the patient points to as the commencement of the disease.

The papules in the case of the patient lasting for a few days appear to have undergone the same changes as those in other characteristic cases do; and on the cuticle bursting and the eruption assuming the peculiar tubercular form, they seem to last from four to eight weeks before drying and disappearing. The patient has been cured of a few of the smaller eruptions since his admission into hospital, and the larger ones shew some tendency to heal.

This patient also complains of a slight burning sensation occasionally in some of the larger eruptions They are not auto-inoculable.

The disease in this case is said (as previously described) to have commenced as a papule on the left leg, which, after assuming a tubercular form, is said to have terminated in an ulcer, and which on healing left the scar which at this moment is very distinct and nearly as large as a five-cent piece. After having a few more on that leg, a few are said to have made their appearance on the other leg, next on the abdomen and chest, next right hand and arm-pits, and lastly on the face. Those on the face were well-marked and prominent on admission, particularly those on the left side of it, where there were three large ones about as large as a cent-piece each, viz., two on the cheek and one over the eyebrow ; they were more or less circular in shape, very much raised above the surrounding skin, and covered with the usual dirty, yellowish-white discharge usual to these cases. The sites of the older eruptions on the different parts of the body are now marked by stains on the skin of a dark hue.

It is difficult, in the case of this patient, to get particulars regarding his disease; but as far as could be ascertained, his skin does not appear to have received any injury before the disease appeared.

The area of the disease here has, to all appearances, been circumscribed ; the eruption as in the other cases appears to have come out in successive crops, and the disease to have originated in contagion.

With the exception of the eruption that first appeared, and terminated in ulceration, leaving the cicatrix already described, the rest apparently underwent the same changes as those in other mild cases, and as described in case No. 18. Besides a slight dryness and roughness about this patient's skin, it cannot be said to be unhealthy. The mucous lining of the mouth and fauces presents a normal appearance, but the tonsils are slightly enlarged

There was no apparent loss of substance in this case anywhere but in the left leg, where the first eruption is said to have made its appearance; here the true skin must have been involved, but in the face and other parts of the body the external layer alone seems to have been concerned.

I am perhaps scarcely in a position to offer any positive opinion, as among which class of cases Parangi should be placed, but I may be pardoned for saying that if the cases similar to those under consideration are to be considered typical of Parangi, they should certainly be placed with the *Yaws* of the West Indies, for the good reason that they resemble that disease in almost every respect.

21st Case.—Illustration No. 17. Galle.

Reported by Mr. F. A. Vandersmagt.

Akoris ; 35 ; male ; Sinhalese labourer.

Dikwella in the Tangalla district, of which place he is said to have been a resident all his life.

Said to have been suffering from the ulcers he now has, on the right hand, wrist, left side and loins, for over a year.

Parangi eruptions ; he complains of having had three or four times since childhood, and that the last attack is said to have ended in ulceration.

Patient is rather slightly built and anæmic.

Primary.—As papules as in other cases.

Secondary.—Ulceration of the tubercle eruption (which the papules were converted into after the last attack.)

Sequel.—Contraction, as in the instance of the patient's hand.

No other members of his family are said to have had any form of the Parangi disease, but several of his relations who are in the habit of frequenting his house are said to be suffering from ulcers, eruptions, &c.

Said to have had no scratch or sore on the body before the eruptions appeared.

The disease, as stated before, is said to have commenced as papules.

A large number of the villagers (rather more than half of them) are said to be suffering from the disease in all stages. The district is full of cases of Parangi.

As in the other cases, the disease in its primary stage is attributed to contagion, and the ulceration &c., to the bad state of health the patients are in when they are taken ill with the disease. Denies ever having had any form of venereal disease.

Has marks of vaccination on the arms, which operation is said to have been done during his childhood before the Parangi eruptions made their appearance.

PARANGI DISEASE.

HISTORIES OF CASES.

The ordinary food patient is said to have lived upon consisted of rice occasionally, jack-fruit, yams, fine grain, &c., meat seldom or never, fish occasionally. The quantity is said to vary from 12 to 25 oz.

Same as above. The better classes are said to be able to afford a meal of rice at least once a day.

Decoctions are said to have been administered in his case in the beginning, but took nothing internally latterly. To the best of his recollection, had no mercury.

This was a case like the last of ulceration over various parts of the body, following the third or fourth attack of the tubercular (moist) variety of Parangi similar to the case just alluded to. There has apparently been so much loss of tissue about the back of the right hand that it has resulted in well-marked contraction as depicted in the sketch. The patient is a middle-aged single man of the Chaliya caste, rather anæmic and thin. When in his village, he is said to have carried on a livelihood as a cooly. The general health of this patient was to all appearance indifferent; besides having anæmia, he is said to have been subject to occasional attacks of ague. Said to have suffered from no constitutional symptoms before the eruption appeared, but has been subject to severe pains about the joints, &c., for several years; in fact, ever since he has had the ulcers.

The Parangi eruptions here appear to have made their appearance and to have undergone the same changes as in the other cases, and, like the one last reported, ulceration is said to have followed the second or third attack, and to such an extent at the back of the right hand that it has resulted in contraction.

The ulceration about the right hand with contraction upwards is as well marked in this case as the contraction of the foot in the other. The parts that were attacked and where the ulcers have healed are marked by characteristic cicatrices; there are several such on the forehead, both legs, shoulders and arms.

The skin of this patient was rather deficient in smoothness and moisture. His throat, with the exception of slight enlargement of the tonsils, presented a normal appearance.

Remarks.—Under the head of remarks, I have thought it necessary to make a summary of the four cases already described—not for the purpose of describing them at greater length as to their general appearance, as I am certain no words of mine could with greater correctness represent them than the masterly and life-like productions of the artist engaged by Government—but to dwell on a few points which I have not had the opportunity of doing before.

It will be necessary, in the first instance, to compare the disease under consideration with one to which it bears some resemblance, and which by some is considered to be one and the same; I allude of course to Syphilis.

It will be observed in the report of the first two cases* of this group that the eruptions are described as not auto-inoculable; the same could be said of other similar cases that have from time to time come under my observation, and is of some importance I believe, as I am by no means certain that the same could be said of those of a syphilitic origin.

In the next place, I shall draw attention to the absence of all severe constitutional symptoms at the onset of this disease, that are present in Syphilis, viz.: fever, severity of general symptoms, general derangement of the functions, nausea, flying pains, frontal headache, depression of spirits, rise in the temperature, &c.

I shall next allude to the character of the eruptions in this disease as distinguished from that in Syphilis.

Although to a certain extent similar in a few cases, I believe it will be admitted that in the latter the papular, pustular, and scaly are what are generally met with, the first being the most common and considered the type and basis of all syphilitic eruptions. Although they are often found associated, the symmetry of distribution and curvilinear character of grouping being considered characteristic in them; in the disease Parangi, on the other hand, the tubercular or moist variety of eruptions is what is commonly met with, as far as my experience goes, the scaly variety being quite exceptional.

I may next mention that although it is a rule for syphilitic cutaneous affections to occur in connection with various forms of ulceration about the palate and fauces, I have failed to observe the same in the cases of Parangi that have come under my observation.

Before bringing my remarks to a close, it may be stated with reference to the two last cases—viz., those of contraction resulting from ulceration following the appearance of the tubercular eruptions—that the ulceration in question does not seem to have been of the usual form after it makes its appearance for the second or third time. If the description of this as given by the patients themselves is correct, it appears to me to be very probably of a lupoid character, and, from certain peculiarities, that form of it known as *Lupus exedens*. I do not by this statement of mine mean to assert that there is any connection between the two diseases, but I simply mention it that those in a position to do so, and where these cases of Parangi in advanced stages occur, may by careful observations set us right by supplying the necessary information, viz., whether cases of this disease in advanced stages degenerate into cases of Lupus or not?

With regard to the microscopical appearances of the eruption and blood of the Parangi cases, it may be mentioned that there is nothing characteristic. I have failed to observe anything but cells, nuclei and granules.

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* Vide Nos. 18 and 19

NOTES ON THE PLATES ACCOMPANYING THE REPORT.

Plate No. 1 shews the occasional distribution of the eruption in circles enclosing patches of skin or cicatrix.

On the feet the fungoid excrescences of "Dumas" are seen, and particularly on the third toe of the left foot.

On the palm of the right hand is a single condylomatous eruption with the peculiar yellow crust wiped off.

Plate No. 2 shews the reticulated and pigmented cicatrix, the result of chronic ulcers following on Parangi. The cicatrix has assumed a keloid character.

Plate No. 3 a & b shews front and back view of the same subject. The case is an excellent example of Parangi as it affects children. It shews the disease in its various stages from the papular commencement to the termination in pigmented patches. It shews the circularly disposed eruption, and in the cleft between the buttocks and down the backs of the legs, typical condylomatous eruption. At the back of the right heel are the pigmented patches resulting from the healing of the ulcers. Suspended from the foreskin are horny-looking crusts.

Plate No. 4 a illustrates the variety known as "Dumas." It shews the fungoid growth protruding through cracks in the soles of the feet and separated all round from the cuticle by deep sulci.

Plate No. 4 b shews the confluent form of eruptions, involving nearly the whole lower lip. Near the right angle of the mouth and to the outer side of the right eye are two lupoid eruptions exhibiting the pigmented and healed portion sunk slightly below the skin, and the extending portion yellow and raised above it.

Plate No. 5, a, b, c, & d are illustrations of what is known as "Pínas Rógé," a chronic ozœna. The case to which C. & D. refer had mercury, and suffers from "Eterpala roga," or nodes in various situations. The case to which A. and B. refer, doubtless had mercury, but there is no record made of it, and he suffers from chronic ulcers and severe nocturnal pains in the bones of his legs. These illustrations shew further the destruction of the nose and palate, and refer to cases suffering from the pernicious influence of mercury.

Plate No. 5 e & f shews further results of the use of mercury. In E. a large cicatrix breaking down and ulcerating at spots is shown. In F. anchylosis and enlargement of the elbow and a dense cicatrix are shewn.

Plate No. 6 shews large contractile cicatrices undergoing ulceration at parts and causing deformities of the feet. The case from which the illustration was taken had mercury administered during the eruptive stage of the disease.

Plate No. 7 shews the initial sore of Parangi on the left inner ankle, studded with eruptions. It shews the eruption in the early stage on the face and foreskin.

Plate No. 8 shews cicatrices, contractions and deformities. The case from which the illustration was made had mercury in the eruptive stage.

Plate No 9 a shews the dark stains left by the eruption after healing.

Plate No. 9 b shews the rupial variety of the eruption and horny scab frequently accompanying it.

Plate No. 10 shews the condylomatous variety of eruption disposed nearly symmetrically over the body of a healthy and well-made little girl.

Plate No. 11 shews (not very clearly) the lupoid form of eruption at the root of the nose and the condylomatous variety elsewhere. It also shews the eruption amongst healthy hairs on the skin and upper lip.

Plate No. 12. A capital illustration of the rupial form of eruption, occurring in a well made and perfectly healthy lad with faultless bones and teeth. To the right of the main figure there is an illustration of the appearance of the subjacent sore after the removal of the scab; and to the left an illustration shewing the way the scab separates from the subjacent sore by the formation of a crack or fissure.

Plate No. 13 shews the eruption on an adult, standing prominently above the surface and covered by the yellowish crust peculiar to the condylomatous kind.

Plate No. 14 shews the rupial and condylomatous eruption occurring in an adult. It shews the color of the scabs in the two cases, and the occasional occurrence of the eruption on the soles of the feet.

Plate No. 15 a & b shews cicatrices, contractions and resulting deformities ascribable to mercury.

Plate No. 16 a & b shews the condylomatous form of eruption covered with the yellowish scab.

Plate No. 17 a & b shews cicatrices and contractions the result of mercury.

Plate No. 18. No history. Keloid-like cicatrix.

PARANGI DISEASE.

APPENDIX A.

Dr. Loos's Report on the Depopulation of the Vanni

APPENDIX.

A.

REPORT of JAMES LOOS, M.D., Colonial Surgeon, "On the Depopulation of the Vanni District."

To the Principal Civil Medical Officer and Inspector-General of Hospitals.

Jaffna, 26th August, 1868.

ADVERTING to your letter of the 19th February last, informing me that His Excellency the Governor had been pleased to appoint me to report on the subject of the Depopulation of the Vanni District, as recommended by the Irrigation Commission, I have the honor to lay before you the following observations, as the result of an inquiry into the subject.

With the view of carrying out the investigation, I left Jaffna for the District of Mullaittívu on the 9th of March last. The route I took, and the places I visited, will be found in the annexed statement. I returned to Jaffna on the 23rd of the same month. Important duties and the unfavourableness of the season prevented my leaving Jaffna again till the 28th of June last, when I proceeded to Anurádhapura by the Central road, and in returning made a tour of the Mannár Vanni, visiting several villages, the names of which also are given in the annexed statement.

I have received ready co-operation from Mr. Russéll, the Government Agent of this Province, who sent orders to the headmen to wait upon me, and give me all the assistance and information in their power. I have also received kind assistance from Messrs. Curgenven and Twynam, the Assistant Agents of Mullaittívu and Mannár. During my journey through the Mannár Vanni, I met Mr. Twynam, who was on circuit through his district, and his personal presence and influence in some of the places was signally useful in facilitating the inquiry.

The objects of the inquiry I gathered from the report of the Irrigation Committee as well as from your letter. The Committee report that depopulation has been going on in the District of Mannár, in the Northern Province, which has led to the "disrepair and abandonment of irrigation works;" that this depopulation is due to frequent outbreaks of cholera, to fever, and "to the prevalence amongst the people, for many years past, of a very fatal disease, reported to be of a syphilitic character;" that, "in reference to the loathsome disease alluded to in the Vanni, no man, woman or child is believed to be free from it;" and they recommend that "a professional inquiry should be instituted into the character and progress of this scourge, with a view to its mitigation."

My attention was therefore directed chiefly to ascertain the nature of the Parangi disease, the complaint referred to, and incidentally to the other causes of depopulation.

That a decline in the population of the Vanni has been going on for an indefinite period, but more markedly within the last fifteen or twenty years, very slight inquiry is sufficient to establish. Cholera has several times, within the last ten years, visited the scattered villages and hamlets of the Vanni, sweeping away many of the inhabitants, and causing a sudden and rapid decrease in the population. Several villages have thus been greatly thinned, and some entirely depopulated, the few who survived having fled panic-stricken from the scene of pestilence. Mallávi, which now has a population of only seven persons, is a striking instance; and Iyan Perumál, another village, has been entirely abandoned. Kompuvaitte Kulam had once sixty-two inhabitants, but the number has dwindled to twenty-three. Some other villages may be mentioned in which the population has declined in an equally striking manner. It is certain that immigration from the coast has had a disastrous influence on the Mannár Vanni; and the introduction of cholera, on each of the occasions that it prevailed there, can be traced to the arrival of immigrants from India.

Another cause tending to the depopulation of the Vanni, and long in operation, is the endemic fever which exists in all seasons of the year, but is more especially prevalent during and after the rains of the north-east monsoon. The fever is usually of the intermittent type, tending, from poverty of living and want of proper treatment, to visceral enlargements and dropsy. Not unfrequently, however, the fever is of a severe form, and more rapid in its course, causing death from affection of the head. I was struck with the number of cases of enlarged spleen I met everywhere, and from which young children were not free. In the villages I visited at the latter period of my journey, I remarked a disproportion in the number of children to the adult population. For instance, in Rámiankulam the number of the inhabitants is sixty-two, of whom twenty-four are women, and only fifteen children. From this circumstance not having been noticed at an earlier period of the inquiry, I am not able to adduce statistics; but after it attracted my attention,

I noted down the number of children, and found a similar disproportion in other villages.

Your letter indicates that Parangi disease is the special object of inquiry. I am alive to the difficulty of the investigation, as I am aware that the disease has not been unnoticed by medical men who have at various times practised in this Island, and that they have been perplexed in forming an opinion with regard to its true nature and origin. I am not willing, therefore, to dogmatize on the subject, although I am stating the result of careful observation.

Native medical books contain allusions to the Parangi leda (Parangi disease.) In Marshall's Topography of Ceylon, an account is given of the disease, derived from native sources. In the chapter headed "Notes regarding the Practice of Medicine among the Kandyans," he observes, that it is a complaint mentioned in Kandyan medical works, that "Parangi leda seems to have been originally intended to denominate a new disease, and from the similarity of the sound and other collateral circumstances, it may perhaps be inferred that the term meant Portuguese disease. There is, however, no tradition among the Kandyans respecting the importation of a disease; and the priests assert that Parangi disease is mentioned in the books which were written during the last incarnation of Buddha."

In a copy in my possession of Hoaston's Notes on the Materia Medica, and the Practice of Medicine of the Sinhalese, written in 1822, laid (according to Ainslie's "Materia Indica") before the Literary Society of Ceylon, but never printed, there is an account of the disease as known to native practitioners. Its varieties, symptoms, and treatment, according to the Sinhalese, are detailed by both Marshall and Hoaston, but nothing satisfactory is stated with regard to its nature or probable causes. Marshall says: "The colloquial communications of the Kandyan vedarálas are very unsatisfactory, relating to any part of their profession, but to none more than respecting Parangi leda. They do not speak of it as a specific disease. It may be communicated, they say, by contact with the affected, particularly by using the same vessels, or walking with the same stick, as those who labour under the disease. This is the way in which they commonly account for the propagation of Parangi, although they allow that it arises spontaneously."

This well expresses the sum and substance of the information I have been able to obtain from conversation with native practitioners, Tamil and Sinhalese. Their ideas respecting the origin of the disease are confused. They believe it to be contagious, and that it is frequently acquired by children playing together, by the use of the same domestic utensils, as well as by cohabitation. Another remark made by Dr Marshall also accords with my experience:—"Vedarálas of the highest reputation use the term Parangi in a very general and undefined sense; except the "Hori" (Scabies) they seem to call every kind of cuticular eruption "Parangi."

I found the same vagueness on the part of those who pointed out to me cases of Parangi, or, as it is more commonly called in this Province, "Kiranti" Affections which would be separately named and classed by European dermatologists are comprehended under the general name of Kiranti or Parangi. The only other skin affections I heard named were Sirangu (itch) and Karappan, also an indefinite class of diseases of the skin of a mild form, apparently papular and vesicular eruptions, from teething in children or from disorder of the digestive organs in adults. The severer and more inveterate forms of skin disease are called Kiranti. Cases of chronic ulcers in the legs were even pointed out as cases of the disease, and two or three appeared to me marked cases of true Leprosy (Elephantiasis Graecorum).

Setting aside the cases which may be easily resolved into well-known forms of skin disease met with everywhere, there is an obscure class of skin diseases, intimately allied and probably having a common origin, prevalent in the interior of Ceylon generally, and more especially in the Vanni. To this class I would restrict the term Parangi. The disease is met with in the maritime parts of the Island, but I am satisfied it is then in a mild and modified form, probably from the aggravating causes not being so fully in operation as they are in the interior. It is met with in both sexes and at all ages; the one sex is not more liable to it than the other, and it is equally common at all periods of life. The eruptions are either pustular or tubercular, less frequently scaly. The pustules are small, round and scattered, with an elevated scab, as in Rupia. The tubercles are at first hard, but afterwards soften and give exit to pus, and the ulcers formed are apt to become sinuous. These frequently run together, and larger ulcers are formed, which are liable to spread The sores are irregular in shape, in some parts deeper than at other parts, covered more or less with yellowish and dark coloured crusts, the discharge ichorous but not copious. I found several persons with ulcers of this kind on the hips and thighs; other parts, however, were also the seats of ulceration. Sometimes the ulcers were found healed in the centre, or were healing in one direction while they were spreading in another, so that extensive portions of the surface were found cicatrized while other portions were ulcerated. In children, ulceration was sometimes observed around the lips, and there were many cases of excoriations at the angles of the mouth, sometimes with white discoloration. In one village (Eraperiakulam) a child had a large ulcer on the right nates, excavated, with yellow sloughs, and another child was in a wretched state of emaciation with several ulcers on the body, and ulceration of the nostrils. The eruptions on the

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Dr. Loos's Report on the Depopulation of the Vanni.

children were pustules or tubercles, the summits of which appeared to have a thin mucous lining from which serum exuded, and some had decidedly mucous tubercles (*Condylomata*) near the anus. In older children and adults, nodes and affections of the bones were common, and obviously connected with the progress of the disease. I met with several young people who had become crippled from this cause and from contraction of the cicatrices of ulcers about the joints. Many also complained of pains in the joints, and it was stated that such pains are often the precursors of the eruptions.

Pustular eruptions were found in all parts of the body, including the face. The most common seats of ulceration were the hips, knees, and elbow-joints; but the dorsum of the foot, the back of the wrist and fingers, fore-arms and legs, were also in many cases ulcerated.

Such are the characteristics of the disease in its aggravated form—a form which, unfortunately, is not rare in the places I visited. Milder cases exist, in which there are few scattered eruptions or circumscribed patches of ulceration. The general health is remarkably unaffected, and there are no signs of constitutional disturbance or great suffering, except in very severe cases. The disease is not viewed as fatal in itself, and from what I have observed it is troublesome and offensive, but does not materially shorten life, except perhaps in the case of very young children.

As many of the already mentioned features of the disease are those of constitutional or tertiary Syphilis, a careful consideration of the whole subject has impressed me with the conviction that the disease itself is of a syphilitic character. The appearance of the pustular eruptions, the affection of the bones (in three cases portions of the palate had been destroyed), the mucous tubercles observed in children, and the syphilitic ulceration, "increasing by one side while the process of healing is slowly taking place on the other," have all served to impress me with this opinion. I have seen several members of the same family affected, and in cases where the parents looked healthy their past history revealed that they had been formerly affected with the complaint, plainly proving a hereditary tendency. There are so few free from it in the Vanni, that it is extremely probable intermarriage has served, not only to disseminate, but to aggravate the disease. In the Mullaittívu district, the worst villages I visited were inhabited by the lower castes, and the Moors were said to be remarkably exempt from this complaint. In the Mannár Vanni it is said to be most prevalent in the Sinhalese villages bordering on Anurádhapura, but I have seen it equally prevalent, in the Mannár Vanni, in villages inhabited by Moors and Tamils. The people of one Moorish village (Sálampan) traced the introduction of the disease among them to intermarriage with the inhabitants of another Moorish village (Súduventapuló). I have not been able to find the marks of syphilis in new-born infants; but it is not impossible that the taint is gradually imparted to the system of the child by the milk of the mother, and it is said that the disease often makes its first appearance about the third month of infancy.

Parangi appears to me a variety of *Lepra*. Some of the severe cases of Parangi appeared to me to correspond closely to descriptions of *Lepra* (or *Psoriasis*) *inveterata*. I am confirmed in this opinion by what one of our most eminent authorities on diseases of the skin, Erasmus Wilson, says with regard to the origin of Lepra. "The cause of Lepra," says this writer, "is a special poison. I have stated my belief, and I see no reason to change the opinion, that leprous poison is in its essence and origin *syphilitic*; that Lepra is, in fact, a manifestation of the syphilitic poison after transmission through at least one, and probably through several generations."

Another affection of the skin, also said to originate in Syphilis and allied to Lepra, exists in the interior of Ceylon. Marshall ("Medical Topography of the Interior of Ceylon") says:—"I have seen a number of Kandyans suffering under a wide-spreading ulceration of the skin. In the Sinhalese language this complaint is *Aramana-wana*. The disease occurs on all parts of the body, except perhaps the hairy scalp. The outer circle of ulcerous surface extends while not unfrequently the central area is healing. Occasionally while some of the ulcers are healing, other parts of the skin become affected and eventually ulcerate." And again:—"This disease occasionally commits great ravages on the face. The forehead, cheeks, and lips are much liable to it. The nose and eyelids, however, suffer more from an extension of the ulceration than perhaps any other parts of the body. Sometimes the alæ of the nose become tubercular and ulcerated, more frequently they are destroyed by the progressive ulceration, which extends along the floor of the nostrils and destroys the velum pendulum palati."

I have met with cases of this kind, although not many; but an intelligent headman at Anurádhapura informed me that cases of *Aramana-wana* are frequently seen in the interior of that district. This disease is certainly *Lupus*, which Wilson classes with Lepra, remarking: "Numerous observations led me to the conclusion that Lepra originates in the syphilitic poison, the poison being modified by transmission through one or more generations. Lupus in some instances is clearly referrible to the poison of Syphilis; in others it seems to appertain to an affection equally mysterious—namely, Scrofula; and Scrofula, I believe to derive one of its sources from Syphilis."

But while expressing my conviction that Parangi disease is to some extent a form of constitutional or hereditary Syphilis, I believe that other causes have a powerful influence on the development of the symptoms and aggravation of the complaint. It requires little

observation to satisfy one that the inhabitants of the Vanni are surrounded by the most unhealthy influences. Long periods of drought lead to the use of water, for drinking and other purposes, which would nauseate ordinary stomachs, and to the absolute neglect of personal cleanliness. The bodies and clothes of the people are filthy in the extreme. The huts in which they live are close and confined, and no doubt favour the spread of the disease. Water is obtained from tanks, the area of which is large, but the depth of water small. These tanks not only supply drinking water, but people bathe in them, and herds of buffaloes lie in them during the heat of the day. The water consequently is thick and muddy, full of organic matter, and, if kept for a little time, decomposes and becomes offensive.

Insufficient food, or the use of unwholesome food, is another source of depravation of the blood, which probably plays its part in the production of the disease. The people themselves term several articles of diet ordinarily consumed by them, "Kiranti food:" buffalo milk and curds, the different kinds of fine grain, some species of vegetables, such as kakiri-kái (*Cucumis muricatus*), brinjals (*Solanum melongena*), and other articles, are so designated. *Kurakkan*, which is largely used by the people, is regarded by them as Kiranti. Although I am not able to speak from much experience, I believe there is no reason to doubt the nutritive qualities of kurakkan, but I suspect the people are right in thinking that it is heating, and that it lays the foundation of disorders of the digestive organs and of the skin, a result attributed also to the constant use of oatmeal and other farinaceous food.

In the letter addressed by Mr. Russell, the Government Agent of Jaffna, to Government, and forwarded with your communication for my information, it is ingeniously supposed that Parangi disease bears resemblance to *Pellagra*, a form of affection of the skin which prevails in the south of France, Italy, and Spain. It is not to be doubted that there are points of close resemblance between the two complaints, but there are also some of difference. It would appear that in Pellagra the eruptions are more *scaly* than tubercular or pustular. The constitutional disturbance is greater; there is more disorder of the digestive functions, and mental despondency and greater failure of strength. The cachexia is marked, but not syphilitic. It has also been suggested to me that the disease is *Land scurvy*. There is no doubt that it acknowledges to some extent the causes of scurvy, and is consequently allied to it; but the symptoms of scurvy are wanting. There are no purpuric patches and spots, no tendency to hemorrhage; the gums are not spongy and do not readily bleed, and there is no great langour and debility. I am myself inclined to think that Parangi answers somewhat to descriptions of *Sibbens* or *Siwens*, which is said to have been once endemic in the south-west of Scotland, but does not now exist, and to other syphiloid diseases which prevail at the present day in Africa and the West Indies. To these, and other forms of skin affection which prevail in different parts of the world among the peasantry or lower classes, Parangi is probably allied. They all most likely arise from the same exciting causes,—insufficient and unwholesome food, bad water, close and confined dwellings, agricultural occupations, and neglect of personal cleanliness: the manifestation of the depraved condition of the system being varied and modified by climate and soil, the physical and moral character of the people, and other circumstances.

Although I have stated that the disease is not fatal, and its influence on health and longevity not very apparent, it is not to be doubted that to those afflicted with it, it is a source of impaired usefulness, extreme discomfort, and a life of wretchedness. Many of the poor people I saw are burdens on their relatives, and some are already the recipients of bounty from the Government. They are likely to be ready victims of other diseases; and the great extent to which the disease in question is prevalent is a cause of degeneration and slow depopulation. As such, it deserves the earnest attention and consideration of the Government.

In the Mullaittivu District, the severest and most numerous cases were found at Kumul-amunai and Putukkudiyiruppu; but no village that I visited was entirely free from the disease. I was informed that some very badly-affected villages existed, but they were not lying in my route. In the Mannàr Vanni, I was able, with the assistance of Mr. Twynam, to learn, in some of the smaller villages, the proportion of affected persons to the healthy, by turning out the inhabitants and passing them in review. The following facts were thus ascertained:—

Sinna Tampanai—Population thirty. Fifteen were formerly affected; two now affected.

Peria Olukkulam—A Sinhalese village; population thirty-five. Seven persons now affected, but several have marks of former affection.

Suduventapulo—A Moorish village; population thirty. Ten now affected, and eight with cicatrices and marks of having been formerly affected.

Salamben—A Moorish village. Population thirty; six persons now sick, and nine with marks of former affection.

Nelukkulam—Population thirty-five, of whom twenty had suffered from the disease but only three are at present affected.

Irampaikkulam—Population thirty; three now affected, but eighteen had the disease.

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Mandukkumindan—Population 100; thirteen now affected; twenty-three had suffered from it.

Pratperiyakulam—Population fifty-five; eleven now affected; forty had the disease, some of whom have marks.

Naddáṇkandal—Population fifty-six; seventy had the disease, and eight are now affected.

The amount of disease in some other places has been similarly noted down, but the above statements are, perhaps, sufficient to convey an idea of the extent to which it exists. A large number of those who are said to be now well must not be considered to have perfectly recovered, as the sores are liable to break out afresh, especially in the wet weather.

The influence of mercury over the disease is remarkable; under its use the eruptions heal, and the marks of the disease disappear, a circumstance which is, perhaps, an additional proof of its syphilitic character. Marshall says:—

"In regard to the treatment of Parangi, the vedarálas are nearly unanimous. They all recommend the use of mercury. They generally, however, give their simple remedies a trial of two or three months before the administration of mercury is commenced."

The caution these men exercised is lost sight of by their degenerate successors, for I do not hesitate to say that mercury cannot be more frightfully abused than it is by the uneducated native medical practitioners of the present day. Every person affected with the disease I inquired of, acknowledged of having taken "*pat-pam*," which is a compound of mercury, turmeric, camphor, China-root and seyang-koddai. *Seyang-koddai* is the marking nut (*Semicarpus anacardium*), the acrid juice found between the laminæ of the shell of which, according to Ainslie, is considered by the Hindus a valuable remedy in scrofula, venereal and leprous affections. The China-root (*Smilax china*) has acquired much reputation for the cure of Parangi, and is known in the Vanni as Parangi-kilangu, or root. But it is regarded only as an auxiliary remedy, and mercury is principally relied upon. The mode of administering mercury by the native practitioners in this disease appears to me to be most injudicious and hurtful. Pat-pam is given twice daily for seven days. When the mouth is becoming affected, the patient is desired to bathe every morning at sunrise for seven days by way of cooling the system, and low diet is enjoined. It appears to me to admit of question whether the nodes, affection of the bones, and rheumatic pains should not be regarded more as the results of the injudicious administration of mercury than the sequences of the disease itself

I feel considerable difficulty in proposing adequate measures for the removal or mitigation of what is rightly considered a scourge of the country. The complete eradication of the disease can only, perhaps, be hoped for, from advancement in civilization and the adoption of improved habits of life among the people themselves. Something may be done by Government to mitigate the disorder. The Irrigation Scheme, which is now receiving the attention of Government, is likely not only to advance the material prosperity of the people, but also do much for the removal of the disorder. More abundant supplies of food and pure water cannot but conduce to improvement in health. It is worthy of consideration whether in the present state of matters, the digging of wells and the use of spring water should not be recommended, and some steps taken to prevent the people procuring supplies from dirty and stagnant pools. I am aware that some prejudices will have to be encountered, as I found that tank water was preferred even in the driest seasons. It is also worthy of consideration whether a few tanks in the Vanni should not be at once repaired, and the people encouraged to settle around them, instead of being left to disperse themselves in small communities over the face of the country. They would be less helpless, and sanitary regulations would be better enforced

With greater confidence I would respectfully suggest some means calculated to relieve the sufferers from the disease, the chief of which is the desirableness of placing within the reach of the people more efficient medical assistance than they have at present. Native practitioners reside in some of the villages of the Vanni, but the only medical aid at present obtainable in most places is during the casual visits to them of itinerant pretenders to medical skill Two or three charitable dispensaries will be the greatest boon that can be conferred upon the people, and will, I am sure, be highly appreciated. A hospital at Mullaittivu and another at Vavuniya-Viláṇkulam would be centrally situated. The Planters' Society's hospital at Pachchilaippalli might, perhaps, with the consent of the planters, be moved further down the Central road. The Immigrant hospitals at Anurádhapura and on the Mannár road might also be made more available for the treatment of sick natives of the country.

In connection with the establishment of hospitals and dispensaries, I cannot refrain from adding a recommendation, with the advantages of which I have been long and deeply impressed—the adoption of a plan of medical education in the Island itself, for training an efficient class of medical practitioners, who will scatter themselves over the country and displace the present class of ignorant quacks. This good work is, to a certain extent, being carried on among the Tamils of Jaffna by Dr. Green of the American Mission; but I think the benefits of improved medical practice deserve to be extended to other districts of the Island and other classes of the community, and this, in my opinion, can be best accomplished by the establishmen of a Medical School in Colombo.

3.

REPORT of JOSHUA DANFORTH, M.D., Assistant Colonial Surgeon, Vavuniya Vilánkulam, Northern Province, on the Parangi Disease.

Government Civil Hospital,
6th January, 1873.

IN compliance with your instructions, the Parangi disease prevailing in the Vanni district has been my special study from the 4th June to the 31st December, 1872, and the following brief account of it is respectfully submitted.

It would not be improper, in the first place, to give a short account of the country, the nature of its climate, and the manners of the inhabitants, their diet, and way of life.

It is not my design to give a geographical description of the district, its situation, rivers, villages, and other particulars of a similar nature. I shall only observe that the whole of it is called the Vanni, and is the northernmost portion of the mainland of the Island. It is much higher than the level of the sea. The whole tract, excepting the paddy fields, which are comparatively few, is covered with woods and thickets. There are numerous tanks throughout the district to facilitate paddy cultivation. It is very thinly populated; the population is of a mixed character, consisting of Sinhalese, Tamils, and Moors.

The soil is a clayey loam and very fertile, and, if the people be credited, it would yield a quantity of paddy sufficient for the whole Province, did not the excessive droughts frequently injure the crops.

The fields are not sown until the tanks are filled by the annual rains in October. There are generally two seed times and two harvest times in the year; the former in October and May, and the latter in February and August. Besides paddy, a variety of pease, kurakkan, sesamum, mustard, and many kinds of melons are cultivated.

The country abounds with herds of common cattle and of buffaloes, which furnish the people plentifully with milk and ghee. Fresh fish from the sea cannot be procured, but a good supply of it is found in the tanks.

The air is generally loaded with exhalations from decomposing vegetable matter. The changes of heat and cold are very frequent and sudden. In summer the weather is clear, calm, and hot; but the middle of the day is cooled by refreshing breezes from the south-west, much mitigating the intense heat of the sun. The winter, which comprises the months of October, November, and December, is moist, warm, and unequal, being perfectly serene at times, but cloudy and tempestuous at others. During the winter there are heavy showers of rain: these annual rains are violent, and commonly accompanied with thunder and lightning and squalls of wind from every point of the compass. Dews fall more or less throughout the year; they are heaviest in January and February. The south-west monsoon continues to blow from March to September, when a change occurs, and north-westerly winds commence to prevail. During the changes of monsoon the winds generally become unsteady and boisterous.

The natives of the district are commonly well-built, and they live to as great an age as the inhabitants of other portions of Ceylon: but they are indolent, with depression of mental and bodily vigour; they are very dirty and sparingly clothed; they marry at an early age, and the marriages are commonly consanguinous. Their houses are small and close, and are built beside the fields near the tanks. They subsist chiefly on rice, kurakkan, milk, and curds. Besides these, a great variety of game, vegetables, and herbs are ordinarily consumed. The dressing of the food is very coarse, and differs materially from the methods of other parts of the Province. They generally make two plentiful meals a day. The water used for drinking and cooking is the stagnant water of the tanks, in which various plants and insects die and rot, and herds of buffaloes lie and dung throughout the day.

Parangi-nasal is the most prevalent disease of the country. With a few exceptions, every one in the district has suffered from it at some period or other of his life. The disease, in my opinion, is a peculiar form of Syphilis, degenerating into Leprosy. It is characterized in its early stages by cutaneous eruptions. They are either squamous, tubercular, vesicular, or pustular, according to the state of the constitution; if the general powers are not much lowered, the eruptions are either tubercular or squamous; when debilitated, they are either vesicular or pustular. Not infrequently all the varieties are met with in the same person at the same time, either the one or the other predominating, according to the degree of debility.

Psoriasis is by far the most frequent of these eruptions; it is often associated with fissures of the skin affecting chiefly the palms of the hands and the soles of the feet.

The next in frequency are the tubercles; some of these are small, rounded, hard, and elevated above the level of the skin, developing in small circular groups with healthy skin intervening and forming a sound centre to each patch; while others are large, soft, isolated, and little elevated above the surface. These are generally scattered over the whole surface of the body.

The vesicular and pustular varieties are not of very common occurrence, and are chiefly found in children of a broken constitution.

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APPENDIX B.

The late Dr. Danforth's Report.

Besides these affections of the skin, the bones and joints are often diseased. Nodes form on the bones of the head, the fore-arms, and legs; swelling and pain are also complained of in all the large joints. Not infrequently the bones of the metacarpus and metatarsus are affected. The tibia in many cases arches forward. Circumscribed, hard, indolent tumors, varying in size from that of a pea to that of an arecanut, often form in the sub-cutaneous areolar tissue; these are chiefly met with over the ribs, the hip bones, and in the neighbourhood of joints.

As the disease advances ulceration sets in, the ulcers commencing in the cracks and fissures of Psoriasis, or in the tubercles, pustules, and vesicles. Not infrequently the ulcers originate in boils of a chronic character. The ulcers in many patients are found in all parts of the body, chiefly on the fore-arms and the legs ; they are circular with elevated edges, and spread in every direction, destroying deeply the affected parts. The secretion of these ulcers is an unhealthy pus or a mere watery ichor. Not infrequently the ulcers are irregular and foul, spreading on one side and healing on the other.

At last symptoms of a formidable character supervene, and all sorts of deformities ensue. The nose, palate, and the cheeks ulcerate ; the nodes terminate in caries ; the gobular tumors soften and break ; the fingers and toes mortify ; the hands and feet lose their sensibility, and pricking pains are often felt in them ; the feet enlarge by the thickening of the tissues, and blebs of various sizes form in them and lead to obstinate ulceration.

Simultaneous with the local manifestations of the disease, a peculiar cachexy declares itself, and the patient becomes pale and anxious with depression of spirits. The surface of the body acquires a peculiar clayish color and a glazy appearance ; not infrequently it is covered with dry, scaly epidermis. The appetite is impaired ; the muscular strength greatly diminished ; and the circulation grows languid. The patient complains of pains in the limbs and inability for exertion, and is at last left in a state of extreme exhaustion induced by the weakening discharges, growing debility, and constant pain.

The disease in some cases is developed in infancy, whilst in others the constitutional tendency to it remains dormant until the age of puberty, very rarely to a later period. Some individuals are more or less affected with it during the most part of a long life without experiencing any great inconvenience from it. Commonly, however, one or more of the distressing symptoms already enumerated appear before adult age.

The disease appears to be as frequent in males as it is in females, and not influenced by sex. A cold, humid atmosphere has a prejudicial influence over the disease, aggravating its existing symptoms ; and it assumes a certain degree of malignity during the wet weather. The disease is perpetuated by intermarriage.

The disease is hereditary Not infrequently it is acquired by cohabitation, and it is also said that it is generated in children playing together or partaking food with the diseased. Wounds and ordinary ulcers often assume the characters of this disease.

The disease is called into activity by debility. The natives are surrounded on all sides with depressing influences.

1.—Malaria, which is abundant in the air, continually and slowly exercises its deteriorating influence, and depresses the vital energies.

2.—The influence of deprivation is great, and is felt in no small degree by the poorer classes of people.

3.—The mode of living contributes largely to depress the vitality ; the food is unwholesome, consisting chiefly of coarse and indigestible articles, and taken more to appease the appetite than for invigorating the constitution ; the dress is scanty, and hardly sufficient to protect from the inclemencies of the weather ; and the people are extremely filthy and most licentious. All these causes concur in lowering the vitality below that healthy standard, which is a preventive not only of the Parangi disease but also of other diseases. The great influence of deprivation, and its consequent debility in the causation of the disease, is demonstrated by the fact that the poorest classes of the people are more diseased than the most wealthy.

The development and progress of the disease may, to a certain extent, be prevented by well-assorted marriage—that is, marriage of the natives with people from other districts. Intermarriage within a very restricted range has been the practice of the people for many generations, and the whole race is deteriorated. The principle, that crossing the breed is the only way to prevent the stock from deteriorating, and the best means of improving it, may be well applied to the inhabitants of the Vanni district. It is not surprising to see the development of diseases, to which man would otherwise be a stranger, by the intermarrying of persons who have hereditary tendencies to particular forms of disease.

A habitual observance of all hygienic rules is not of less importance. The enjoyment of a pure air ; attention to clothing, so as to obviate the injurious influence of atmospheric vicissitudes ; a wholesome diet, cleanliness, and avoidance of all excesses, are the means upon which we must mainly base our hopes of arresting the progress of this disease. For the attainment of these means, there must be good thoroughfare roads in the various directions and public markets in different localities, for increased traffic, so as to enable the inhabitants to procure food, clothing, and other necessaries of life without much trouble or expense. The state of their dwellings, which are close and shut up by jungle, should be improved ; they must be encouraged either to use spring-water or filter habitually

through charcoal the water they use; and, above all, the people should advance in civilization.

In the treatment of the disease, the prominent indication is to support the general energies of the system. For this purpose, the administration of tonics and alteratives, with a nourishing diet, has been found advantageous. The remedies which have been found best calculated to improve the constitutional powers and ameliorate the symptoms of the disease, are cinchona and its preparations, iron, iodine, cod-liver oil, sarsaparilla, mineral acids, and the preparations of potash.

Mercury appears to be of the greatest service in the disease, under cautious management. Many cases have been relieved by the employment of perchloride of mercury in conjunction with iodide of potassium and sarsaparilla. When the influence of mercury is carried to the extent of producing a manifest mercurial action in the system, it accelerates the progress of the disease, and deteriorates the general habit of the body.

Cases.

Of the cases that have come under my notice, several are of the following type:—

Case I.—P. P., a Moor woman, aged twenty years, was admitted July 11, 1872, with Morbus Parangi. She states that her parents were diseased, and that she in her childhood suffered from an eruption which was cured by native medicine. About eight years ago a scaly eruption, covering her whole surface, made its appearance, and was followed by ulcers in different parts of her body, chiefly in the extremities. She was completely crippled by the disease, and native medicines, of which she took a great number, had done her no good. On admission, she was pale, anæmic, and emaciated; her fore-arms were thin and covered with old scars; the hands were flexed at the wrists by the contraction of cicatrices. The legs, from the knee downwards, were covered with variously shaped ulcers discharging a sanious fluid; the bones were exposed and carious in several places; the feet were benumbed and insensible; the left foot was much enlarged by the thickening of the tissues. She menstruated at her fourteenth year, and the catamenia have subsequently appeared regularly. Her appetite was good and the bowels open, moving once or twice daily, but her sleep was disturbed by the pricking pains in the legs. She was treated with iodide of potassium and sarsaparilla, and fed with good nourishment to improve the general health. She continued to improve from the date of her admission, and in two months recovered the use of her lower limbs, which had been lost nearly eight years. She was discharged on the 3rd October, much improved.

Case II.—P. K., Tamil, aged eighteen years, was admitted August 27, 1872, with Morbus Parangi. He states that his parents were healthy, and his brothers never suffered from the disease. When he was young he suffered from ulcers, which were cured by the administration of mercury. From that time up to the age of fifteen years he was in the enjoyment of very good health, when the disease declared itself in the form of nodes in his legs, and had crippled him for the last three years. On admission he was pale and emaciated, with an anxious expression of his countenance. The legs were thin and ulcerated, the ulcers exposing carious bone in several places. The feet had lost their sensibility. The fore part of the right foot was much enlarged, and the great toe was flexed and distorted; the enlarged extremity of the foot was perforated with numerous small openings, which exuded an unhealthy-looking pus. His appetite was good, sleep sound, and the pulse languid. The general surface exhibited a glazy appearance. The patient was at once put upon iodide of potassium and sarsaparilla, with a nourishing diet. He gained health and strength rapidly, and left the hospital on the 8th October, much improved. There is every hope of his wholly recovering the use of his limbs.

The natives suppose the disease to be venereal, depending on their habits, mode of living, &c. They seem to know nothing about its origin or progress. Many attribute it to the influence of evil spirits, witchcraft and charms. Their remedies for it are mercury and China root. These are so administered as to depress the vitality, and to prove worse than the disease. The reputed Tamil medical author, Agastiyar, has in one of his works mentioned Parangi disease to be a variety of Leprosy ("[illegible]," Leprosy called Parangi.) His remedy for it is gold.

Allow me to submit thus much on the Parangi disease, which, I venture to suggest, may more appropriately be termed the "Vanni plague."

I regret that I have not as yet learned any indigenous remedy which I can with confidence recommend for this dire scourge. If permitted, I propose to make trials of any roots and herbs which the region may afford, of any promise for the relief of these sufferers, and hope, though faintly, that I may be able to report subsequently something more favourable than I have yet done.

C.

REPORT on Parangi in the District of Kurunégala, by Mr. T. F. GARVIN, M.B.

THE district of Kurunégala is notorious as one of the chief among those afflicted with the terrible scourge of Parangi disease, particularly that portion of it known under the designation of the Vanni.

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The district comprises an area of 2,242 square miles, and possesses a total population of 203,756 souls, most of them Siphalese, but with a pretty free admixture here and there of the Tamil and Moorish element.

The district is indifferently watered, fairly fertile, the Vanni being the worst off in both these respects, and it is comparatively thinly-peopled, there being an average of 90·8 souls to the square mile. The death-rate, which must be considered only approximative since registration is not as yet of universal application, is very high—*i. e.*, as many as 36 in 1,000: and it is largely influenced by the mortality amongst infants and children, for of a total of 7,821 deaths no less than 3,460 occurred among children.

The people of the district are not affluent; their possessions consist of some ancestral land, and perhaps a few head of cattle; their sole occupation is the cultivation of their lands, and their sole means of sustenance the produce. Where their poverty is great, and where the produce is insufficient for their upkeep, it is bartered for less expensive articles on which to drag on a miserable existence.

The dwellings consist of miserable little thatched huts made of mud and wattle, and so close and dark as to render residence in them a disagreeable experience. The houses are generally over-crowded, and, being built in blocks, admit of the free and easy transit of infectious agents from one into the other.

The people are as a rule uncleanly, and resort to personal ablution only under extraordinary circumstances.

Polygamy and the opposite condition—of two or more men, frequently brothers, living in open concubinage with one woman prevail throughout the district, and more so in those parts farthest from the local centre of civilization—the chief town.

The people are very prolific, but their poverty being great, and the means for the adequate maintenance of their children beyond their reach, many of them yield, before they are many years old, to the wasting diseases generated by lack of nourishment and the too early resort to farinaceous food, a condition of anæmia being generated, which, quickly passing on to diarrhœa and dropsy, becomes the chief factor of the great mortality.

The food of the people consists of various kinds of grain grown by them, and chiefly of rice and kurakkan, the latter being the staple article of diet particularly among the pauperised inhabitants of the Vanni.

Beef in any shape is a luxury beyond the reach of a very great many.

The water used is very bad. It is generally muddy, obtained as a rule from tanks in which it has stagnated, it may be for months, and contains an abundance of organic matter suspended or dissolved. The tanks which furnish the water are utilised also for washing, bathing, &c., and during the warm hours of the day the cattle take refuge in the sparse shades of the trees bordering them, and lie for hours imbedded in the mud or water, passing their excrement in, and yielding the dirt accumulated on their hides to the already sufficiently contaminated water.

Having entered into this, somewhat prolix, it may be, description of the condition of the people and of the district they inhabit, I shall now proceed to describe the disease itself as I have witnessed it in the district.

In the majority of cases a sore, the result of injury or scratching, occurring generally over some bony prominence as the ankle skin, back of elbow, &c., is the initial symptom. The sore itself has no other connection with the disease than that it affords an avenue for the introduction of the virus into the system It is purely a coincidence. The sore is usually indolent and slow to heal, and when cicatrization has well advanced or has just been completed, certain symptoms occur which are clearly referrible to some systemic disturbance. These symptoms are malaise, loss of appetite, slight fever, headache, and pains in most of the large joints of the body, lasting over a period varying from two to eight days. These symptoms precede only the evolution of the first crop of eruptions, and even in those cases where, in a person considered cured but for a solitary eruption, a fresh evolution takes place, these systemic symptoms are absent. On the subsidence of these symptoms, the characteristic eruption becomes evolved in successive crops over the face, head, and body generally. The eruption occurs also on the tongue and fauces though by no means universally. In some cases the pharynx appears inflamed, the soft palate ulcerated and adherent to the fauces or slightly cleft.

In some instances there seems to be some method in the distribution of the eruption, and in nearly all cases there is some approach to a symmetrical distribution on the opposite halves of the body.

Unlike Herpes, the eruption does not follow the course or distribution of the nerves; but it develops best at the flexures of the joints, and at certain normal folds of the skin as in the groin, nates, &c.

The eruption occurs frequently in patches, irregular in shape and varying in size. Each eruption usually retains its individuality, though in some instances the eruptions are so closely packed as to run into each other and cover considerable surfaces.

As a rule, the eruption occurs first on the face, generally on the chin, and then spreads to the rest of the body.

There are three different kinds of eruptions, one very like ordinary syphilitic Rupia; another like Condylomata; and a third form in which a solution of continuity never results, and in which the epidermis appears raised and the sub-epidermal tissues swollen and discolored in one direction, and slightly depressed, deeply pigmented, and quite healed at another and usually opposite direction.

The eruption occurs first as papules, and resembles ordinary acne to a striking extent. The papules, however, never really turn into pustules, resembling lichen in this respect. The papules increase in size and prominence, their apices become roughened from desquamation of the epidermal scales, and a thin fluid exudes and, quickly coagulating and mixing with the loose scales, forms the scab. The enlargement of the papule, the roughening of the apex, and the occurrence of the exudation continue till, at last, a line of demarcation or crack occurs at the point of contact of the healthy skin with the diseased, and then the scab appears fully developed, and the eruption well matured. The scab so formed resembles the scab of Rupia to a very great extent, but it is less stratified and cone-shaped. It is dead to sensibility, and a pin may be driven through it without causing any inconvenience till the subjacent sore is reached, when only pain is elicited. The sore resembles a raspberry and, when viewed magnified, the edible portion of the pomegranate. It consists of firm, pinkish granulations of larger size than normal, so arranged as to look like a warty growth The sore is very sensitive, and bleeds when handled at all roughly. It appears to me to be made up of hypertrophied papilla. On being exposed, the surface of the sore becomes quickly covered over with a thin layer of lymph, which coagulates, obscures its surface, dries up to a thin tissue-paper consistence, and becomes the slightly depressed and subsequently pigmented cicatrix. The sore is thus healed in a day or two, but the pigmentation of the cicatrix continues for some little time about ten days. The scab is never reproduced even in eruptions that are not quite mature.

In the variety which resembles Condylomata, the scab is removed, directly it forms, and an ulcer, covered with a dirty yellowish scab of soft consistence, distinctly the result of coagulated pus, forms. This variety generally occurs on surfaces exposed to constant friction, as in the arm-pits, the perineum, and the fissure between the buttocks. They are at first papular, but from rough handling or constant irritation become condyloma-like sores.

The method of healing is the same in this variety as in the rupia-like eruption, viz., by a gradual development of cicatricial tissue, which becomes pigmented till a very dark color is attained. In the third variety healing occurs simply by desquamation of the superficial layers of the epidermis and a fresh development of pigmented cells. The eruption in this variety is peculiar in that it seems to be limited to the uppermost layers of the epidermis, which assume a clouded and yellow colour, and are finally replaced by fresh and healthy cells from the *rete mucosum*.

Although these three different forms of eruptions are so common as to be at once noticed, they appear to me to be simply modifications of the typical rupia-like eruption The moist condyloma-like eruption is the same as the rupia-like eruption, only that through the constant friction to which the part is exposed the scab is never allowed time to develop, being swept off each time it attains slight prominence.

The third variety differs only in the depth to which morbid action extends, which in this instance appears to be limited to the uppermost layers of epidermal scales.

In all cases the resulting cicatrix is deeply pigmented and slightly depressed for a short time. The pigmentation of the cicatrix continues till the colour assumed is very dark, and the cicatrix retains this colour in some instances for years ; so that by a careful examination of the skin of a person suspected of having had the disease within the above-named period, a fairly correct opinion may be ventured. The eruption appears to me to be the result of inflammation of the upper portions of the skin, attended by an exudation which quickly solidifies, and necrosis of the epidermis varying in depth in different cases.

I have made examinations of sections of the eruptions with the microscope, but, I am sorry to have to confess, with no great result ; the only impression which I have received being that all the morbid action is situated above the papillæ, which appear hypertrophied.

Microscopical examination of the blood gave negative results, and, beyond an excessive corrugation of the walls of the red corpuscles, nothing particular was noted. The relative proportion of white and red corpuscles appeared normal.

There are certain other skin diseases classed by the natives under Parangi, but they are easily identified with those known and described by authorities on the subject. Among the chief of these is what is known as "Dumas," a disease of the soles of the feet and palms of the hand, characterized by deep fissuring, cracking and perforation of the cuticle, so as to give to it a worm-eaten appearance. This appears to me to be an aggravated Psoriasis. It yields to the assiduous employment of cleanliness and some stimulating oleaginous application, such as carbolic oil or creasote ointment. It is exceedingly common among natives who have never been in districts afflicted with Parangi, and who have never been exposed to the risk of contagion. I have seen it very frequently in Sinhalese women residing in and about Colombo. It appears to me to be the result of constant irritation from particles of sand. Again, there are forms of ulceration marked by their great destructiveness and by the resulting cicatrix being very contractile, which are looked upon as the sequelæ of Parangi disease. I have not been able to gather sufficient evidence to lead me to endorse this view ; my investigations seeming rather to lend weight to the view that they are in no way directly connected with the Parangi disease, that they are purely the result of mal-nutrition or struma, and that they occur after Parangi simply as they would follow any debilitating disease.

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There is still another class of cases considered as Parangi, in which the bones suffer. Here the bones become enlarged, nodular, or variously distorted, the distortion being most marked at points which are most exposed to pressure, or which have to support most weight, as for instance the tibia, which as a rule bends so that the convexity is forward. This class of cases is easily referred to Rickets and to Syphilis.

Is the disease hereditary? The answer to this question is No. That a large number of cases occur among the offspring of those previously affected, is true, but this is due more to their exposure to contagion than to any inherent susceptibility or vulnerability they possess. Parangi is certainly not hereditary in the way Syphilis is. I have never seen or heard of a congenital case, though I know of abundant instances in which the disease developed shortly after birth, and was clearly, then, traceable to contagion.

There are, again, several instances of parents distinctly affected giving birth to exceedingly healthy children, and of children contracting the disease and communicating it to their healthy and previously unaffected parents.

The next question which suggests itself is:—Whether the disease is contagious or non-contagious? This question has already incidentally been touched upon, and I have no hesitation in stating that the disease is contagious—*i. e.*, that it requires for its propagation the downright contact of the diseased with the healthy surface. It is not essential to the communicability of the disease that the surface exposed should be broken or excoriated, as the following case so well illustrates. A father and child were admitted suffering from Parangi, the eruption being well out in both, and nearly of the same age and duration. The father stated emphatically that the child developed the disease first, and that he contracted it from the child. The child had one large eruption on the foreskin, and the first eruption on the father occurred on his right side, viz., at the exact spot the child's foreskin would rest against when he was carried about by his father after the fashion of the natives, viz., with the legs of the child encircling the father's waist and crossing themselves over the opposite hip. I might multiply instances of the disease being communicated by contact, but I think the case above detailed so conclusive as to render further proof superfluous.

The disease is not auto-inoculable. Several attempts at auto-inoculation made by me ended in failure, whether the material used was blood or the discharge from an eruption. In one instance a freshly removed scab was left in contact with sound skin for twenty-four hours without any result.

There are several instances in which children have communicated the disease to the breast of the mother, both when the skin was broken and unbroken, but in all cases that I have seen the child communicating the disease has had an eruption on the mouth

I have known instances in which Parangi was communicated during sexual intercourse, and by long residence among and free intercourse with the sick.

That a new arrival afflicted with the disease in a previously healthy village could spread the disease, is beyond doubt, when the contagious nature of the disease is recognised and considered. I am not personally aware that Parangi has been contracted in a hospital ward I believe that it is very seldom that the disease is contracted in hospital, though I don't deny that it is perfectly possible. One of the cases I have reported would seem to trace his disease to contagion in a hospital ward. That case states that he came in with a sore, that the sore healed in the hospital, and that after he left and went back to his village, the disease appeared. He confesses to a family history of Parangi, however. It appears to me that this case did really contract the disease in hospital, for the disease appears shortly after the initial sore heals, and immediately after his leaving the hospital. His mother, the last person related to him that had the disease, was quite well for a long time before he came to the hospital to have his sore cured. If it is believed that this case contracted the disease from his mother, we must admit an exceedingly prolonged period of incubation. The result of observation is that the period of incubation is short, about two months the most.

I hold, then, that Parangi disease is not hereditary; that it is contagious; that it is not auto-inoculable; that is, communicable through the broken and unbroken skin alike; that only the virus contained in an eruption is effectual; and that the downright contact of the disease with the healthy tissue is essential to the propagation of the disease.

Parangi runs a definite course in all cases, but treatment modifies it and cuts it short. It has no tendency to spontaneous cure, but, on the contrary, if left to itself, it may persist for years, gradually debilitating the sufferer and rendering his system prone to contract other diseases. Its action on the system in these chronic cases is similar to that exerted by chronic suppurations generally.

It is not a disease of debility. It attacks the half-starved and well-favoured alike. It is infinitely more common among the poor for the simple reason that the inhabitants of the villages most affected are poor. I have had a large number of cases occurring among the well-to-do natives under my treatment.

The disease is not restricted to the Sinhalese only, but it occurs among the Malabars and Moors as well.

If the eruption is once removed entirely by treatment, no recurrence takes place; but if a single eruption exists, the person is not safe, as the disease is sure to recur.

A first attack seems to exhaust the susceptibility of the system, and I am not aware of a single instance of the recurrence of the disease or the accession of a fresh attack in

one who has been thoroughly cured in whom the treatment has removed every vestige of the eruption.

Although the eruption is loathsome, extensive, and troublesome, it has very little effect upon the general health; except of course in those cases in which it is exceptionally severe or where it has existed for a considerable period. There are a great many who in their childhood or youth, suffered from the disease, and still lived to a ripe old age.

The disease certainly does not interfere with the ordinary course of pregnancy. Miscarriages and still-births are rare among the people. I have had under treatment some women gone as far as seven months pregnant, who were literally covered with the eruption, but I have never seen a miscarriage among them.

In two cases of Parangi I practised vaccination with the result of inducing genuine cow-pox in both instances, and in one case a slightly marked amelioration of the symptoms. The vesicles ran the usual course, yielded clear lymph and healed perfectly. I did not feel justified in using the lymph so obtained, or the question whether vaccination can communicate the disease or no, might have been settled.

Parangi does not appear to me to be in any way related to Syphilis. It is peculiarly a primary disease, and in all cases there has been an absence of the usual symptoms pointing to syphilitic infection. The appearance of the Parangi eruption is so like syphilitic rupia that the superficial observer would at once consider both diseases similar. Parangi is also in no way connected with Leprosy or Lupus.

The two diseases Parangi most resembles are Ecthyma and Frambœsia. It appears to differ from Ecthyma in its chronicity, in the eruption being tubercular rather than pustular, in the scab not being reproduced, in the resulting ulcer being generally healthy and quickly healed, and in the comparatively slight extent to which the system is affected.

Parangi resembles Frambœsia to a very great extent. I have never seen the latter disease, but the excellent descriptions of it in Drs. Tilbury Fox and Farquharson's book seem to me to give a fair idea of Parangi disease too. The eruption of Parangi is not exactly like that of Frambœsia, but resembles it to a great extent, particularly the moist form described above. It appears to me that Parangi and Yaws are identical, and that the differences observed in the two diseases may be the result of the differences in the climate and in the surroundings of the people. The treatment seems to be the same in both diseases.

It has been the custom among the native doctors or vedarálas, for ages, to treat Parangi with mercury and with China root (*Smilax china.*) They use fumigation with vermillion very extensively for the drying up of the scabs, and after that they combine arsenic with vermillion in the fumigation. Mercury is always an important ingredient of the thousand and one specifics for this disease used by the natives. The treatment which has yielded the best result in hospital practice is calomel and opium given till the gums are touched, then suspended temporarily and resumed, and equal parts of citrine ointment and oil well rubbed in after a bath and after the removal of the scabs. I think iodide of potassium given with mercury lessens to a great extent the efficacy of the latter, probably by causing its elimination before it has had time to exert its beneficial effects. I have used sulphur and cream of tartar in some instances, but I have not been able to trace any good effects of them. The combination seems to do children some good by acting as a slight laxative and alterative. As a local application I have frequently used solid nitrate of silver, particularly in those obstinate and painful eruptions occurring on the sole of the foot. When the ulcers resulting from the eruptions are slow to heal, I have obtained good results from the local application of cod-liver oil.

As I have stated elsewhere, the disease is perfectly amenable to treatment. The duration varies to a great extent—from two months to as many years. It usually runs a chronic course. The moist form or the condyloma-like form of eruption takes longer to cure than the rupia-like form.

Regarding prophylactic measures, I am of opinion, considering the highly contagious nature of the disease, that nothing short of perfect isolation of the sick can be effectual. The principle is recognised by the natives themselves, and they invariably make an attempt at enforcing it, but, as a rule, unsuccessfully, as the spread—uninterrupted spread—of the disease testifies

I am not in a position to state the causation of the disease, but I have little doubt that the insanitary state of the dwellings, the miserable food, and the execrable water, do largely influence its prevalence and extension The etiological significance of these circumstances must be my excuse for the somewhat lengthy introduction of this paper.

There are some interesting and important points in connection with this disease, such as the communicability of the disease to the lower animals, and by vaccination, &c., which I have not been able to study as yet, but which I hope to make the subject of a future paper.

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APPENDIX D

Report of Mr. Attygalle.

D.

REPORT of J. ATTYGALLE, M.B., Assistant Colonial Surgeon, on the District of Anurádhapura and on Parangi Disease.

ANURÁDHAPURA, formerly the seat of an Assistant Agency, is the chief town of the newly-created North-Central Province of Ceylon, and is resided in by the Agent and other chief officials. It is situated at about midway between Puttalam and Trincomalee, and 85 miles to the north of Kandy. Its height above sea-level is 312 feet, and about half-a-mile square in extent at the present day. In former times, Anurádhapura was the chief capital of Ceylon, and kings reigned there successively from about B. C. 400, when it was founded by King Pandukalhaya up to the 14th century of the present era. At that time it was one of the largest cities in the East, if not in the whole world, and is said to have been no less than 16 miles square in extent, streets paved and adorned with shops of merchants from all parts of the world, including the famous Sabaan merchants of Persia, who took myrrh and other kindred objects to ancient Rome. Owing to frequent inroads of the Malabar invaders and other causes, Anurádhapura was abandoned by the Sinhalese kings as a seat of Government latterly, and it gradually went to utter ruin; and a few years ago it was reduced to a very insignificant place, with a few boutiques and the residences of about half-a-dozen Government officers surrounded by thick jungle. Since it became the seat of an Agency, a great change for the better has taken place. The whole place is cleared of the jungle, new boutiques are springing up on every side, several new roads are being constructed by Government, and a large number of highly finished houses built for the occupation of the increased staff of the Government officers, all of which add not a little to the beauty of the town; whilst the numerous remains of ancient buildings and magnificent works of stone sculpture make it one of great interest to archæologists and visitors.

The whole Province is about 4,532 square miles in extent, and is a dry, flat country, with hardly any hills of any consequence, save perhaps a few hillocks like those to be seen at Mihintalé on the North-Central road. The soil appears to be partly sandy and partly clayey, very fertile for paddy cultivation, which was the chief industry of the country in former times, and carried on to such an extent as to have earned for it the name of "Granary of Ceylon." In those days the country was irrigated by a most perfect system of village tanks connected with one another by channels and supplemented by such large works as Kalawewa and Minneriya. But all this has been long changed from the utter disrepair into which the tanks and other irrigation works in the district fell in the time of the late Sinhalese kings and early years of British Government. The fields were abandoned by people, and the tanks which irrigated them are converted into thick forest land, and the greater part of the whole province may be now said to be one vast wilderness, only interspersed by a few villages here and there and inhabited by a poverty-stricken and sickly people, though once the abode of a teeming and thriving population. However, it is satisfactory to observe that during the last few years a different and a very liberal policy is adopted by Government towards this province, and already a good number of the village tanks have been repaired under its auspices, besides the restoration of several large irrigation tanks such as Madawachchi. The roads, too, have been vastly improved for traffic, and altogether, if matters go on as at present, the district, though perhaps it might not attain the same pre-eminence which it enjoyed in its palmy days of old, bids fair to become one of the most important and prosperous provinces in Ceylon at no distant date.

The productions of the district are fine grain (kurakkan) and paddy, but of late years, owing to the restrictions very properly placed on the cultivation of the former by Government and the scarcity of rain for the latter, both these have been produced in very limited quantities; but with the repair of village tanks, and the unusual and heavy rains which fell throughout the district this year, a great impetus is likely to be given for the cultivation of this cereal: and the next few years, it is believed by many, will be those of plenty and the commencement of a new era of prosperity. As animal products of the district, may be mentioned skins and horns (especially deer and elk), and a large quantity of them is yearly carried away by traders, chiefly Moormen. There are no rivers of importance passing through this province. There are several streams or rivulets, of which the principal ones are Kalá-oya and Malwatu-oya. The former forms the south-western boundary of the province, and the latter traverses from east to west for some distance, and then taking a long north-westerly course and passing about a mile from the town of Anurádhapura on the east, it empties itself into the sea near Arippu on the west coast. There are several roads traversing the province in all directions, and most of them are passable for wheel traffic. Of these, however, the most important ones are Puttalam and Trincomalee road which traverses the district from east to west, passing through Anurádhapura and the North-Central road, which forms a portion of the main road from Jaffna to Kandy. This passes through Mihintalé, which is situated about eight miles from Anurádhapura, and is the great immigration route for all coolies coming to the Island from the northern parts of Ceylon. There are seven halting stations on this road in this Province for immigrants, all of which are placed in charge of medical practitioners, and provided with good and permanent bungalows and hospitals for the convenience of these people, with a regular staff of servants to attend to their wants.

Population.—The population of the whole Province according to the census of 1871 is as follows :—

Anurádhapura	...	702
Nuwaragam-paláta	...	20,403
Kuralu-paláta		28,273
Kalagam-paláta	..	4,504
Tamankaduwa	...	4,768
Total		58,650

Since then there has been no appreciable increase in the indigenous population, but the number of temporary residents have been vastly increased, especially in the town and its environs by the influx of a large body of Malabar coolies and low-country Sinhalese in search of employment. The chief means of living of the people at large is manual labour, either as cultivators or employés of the numerous public works carried on by Government in the Province. Water used by the people, though abundant and of pretty good quality in rainy weather, is very scarce and very unwholesome during dry weather. It is chiefly taken from tanks, which in some seasons of the year are reduced to mere muddy puddles, and that being the only available source of water in many instances, is shared alike by man and beast.

Habitations of the people are generally very simple, primitive in style, and clustered together as a rule in the same compound, either adjoining each other or at very close distances, and built with an utter disregard of all sanitary rules. They are covered with straw and dried grass, and usually composed of a single room and a narrow open pilá (outer verandah) in front. The houses are raised about a foot or two above surrounding ground. The rooms are entered by a simple doorway and without windows or openings of any kind, either to admit light or air, and are quite dark even at midday.

The food of the people in the rural districts consists principally of fine grain (kurakkan), maize and yams. In seasons of scarcity many live for days on edible jungle leaves and roots, and, except very well-to-do classes, none even taste rice. In fact, they are so habituated to live on fine grain, it is not at all uncommon to find even when they get paddy, to barter it for the other. Tyre and dried meat are frequently eaten with fine grain, and at certain seasons when the tanks begin to dry they indulge in tank fish to an inordinate extent, which not unfrequently gives rise to those outbreaks of cholera reported from the villages, and are often no more than acute diarrhœa brought on by unwholesome and indigestible food. Fine grain (kurakkan) itself, though said to be richer in nitrogenous elements than rice, does not appear to me by any means to be a wholesome food, and the equally bad water which the people use, are the chief causes of the diseases prevalent among them, viz , Parangi and malarious fever.

The climate of the Province is alternately hot and fairly temperate, according to the seasons of the year, whether dry or wet, respectively. During the hot seasons, which are from January to April, June and September, the heat is very unbearable, and has a very depressing effect on all constitutions It appears to be unsuited to persons of bilious temperament among the Europeans in particular.

The weather during the year 1877 may be said to have been exceptionally hot and wet, as will appear presently. It commenced dry in January after slight rains in December preceding, and there was no rain at all save a passing slight shower occasionally till the end of April, when, with the change of the monsoon wet weather set in. This lasted till the end of May, and during that time there were many heavy showers accompanied with much thunder and lightning. From June till the end of September, for full four months, it was one continued drought, and there was hardly any rain worth noticing fallen throughout the Province During this period nearly all the tanks and streams in the district became quite dry, and even the Malwatu-oya, which was never known to have dried up at Ellaskattuwa, failed to give water, and only a little collected in the newly-repaired tank Bassawakkulam by the April rains saved the people from utter deprivation of it for their wants. In the villages many cattle died, and the agricultural industries of the district were almost wholly paralysed. From October to the close of the year the weather was very wet. It rained heavily throughout the Province, all the tanks and streams and oyas filled to overflowing, and in many instances were attended with heavy floods for days together. It is said that such rains never occurred in this Province within the memory of the oldest living man, and those village tanks and other irrigation works lately constructed under the auspices of Government stood in good need, and proved to be of immense service to the people to store up water for the cultivation of their paddy fields.

(For range of Barometer, &c., vide Meteorological Table in annual return of sick.)

General Health.—The chief diseases which prevail in the district (endemically) are Fever and Parangi. The former is to be met with at all seasons of the year, but it generally assumes an epidemic form during wet weather, and immediately after it. It is usually of an intermittent nature, and in the majority of cases assumes a tertian type, and proves sometimes very obstinate of cure, though as a rule it readily yields to quinine and arsenic. This year it prevailed to a considerable extent from October to December, both among the town residents and villagers in the distant parts of the Province. Fever powders

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were distributed to them with much benefit, and I believe very few deaths occurred from the disease. This disease is caused by the malaria emanating from the marshy tanks, which abounds all over the Province, as well as from the vast forest and low scrubby jungle which cover almost the entire surface of the country. The miasmatic poison may affect the system either through the air which the people inhale or the water they drink, both of which no doubt must be highly impregnated with it under such circumstances. If the disease continues for a long time, and the sufferers are subjected to frequent attacks, it leads to visceral enlargements especially of the liver and spleen. This latter organ is so increased in size at times as to occupy nearly the whole abdominal cavity, and defective circulation brings on dropsy accompanied with a more or less anæmic state of the system, and ultimately results in death.

Parangi is a disease very common among the rural population of this district. Its history is imperfectly known, but from the absence of any mention of it in any of the early Siphalese medical books, its appearance among the people evidently is comparatively of a very recent date.

The name Parangi has been probably given to the disease from the belief that it was first introduced into Ceylon by the Portuguese, but there is no direct proof of it, and further improbable for many reasons, the chief of which is that any such disease has been entirely unknown in Europe, though it was ingeniously supposed by a late Government Agent of the Northern Province, as Dr. Loos very properly remarks in his able and instructive report on the depopulation of Vanni, that it bore a resemblance to *Pellagra*, a form of skin disease which prevailed in France, Italy, and Spain. It is possible that the disease came to the notice of the people in a marked manner about the time the Portuguese landed in Ceylon; which might have given rise to the belief referred to above, viz., it having been brought there by them. Its true nature I believe is yet undetermined by the profession. As far as my own observation goes, it appears to me to be a disease *sui generis* much allied to and having characteristics in common with Syphilis, and which has induced some medical men to view it as a form of that disease akin to its tertiary type. But there are certain peculiarities in Parangi having no analogy with Syphilis whatever, that I think it is therefore entitled to a separate place in our Nosology

The disease attacks both the sexes of all classes and ages without distinction. It is highly contagious, and not unfrequently communicated by cohabitation, and also said to be transmitted hereditarily. But this latter point is however to my mind not fully established, and it seems to me that it is propagated from parent to children either by contagion, or developed *de novo* by the very same causes which give rise to it in the former, rather than inheriting it in a manner similar to congenital Syphilis. That this seems to be probable is borne out by the fact that the disease seldom or never manifests itself before the children are weaned and they are two or three years of age. And as an additional reason for considering the hereditary nature of the disease in the general acceptation of the term as being open to question, I may mention the case of a girl—though a solitary one—who was born of undoubted Parangi parents, but removed when near about to be weaned to a part of the country where the disease was quite unknown, and brought up under different circumstances, remaining, though now a grown-up woman, perfectly healthy and free from the slightest trace of it. There is no doubt as to its contagiousness, and even at the present moment there is a boy under my treatment whose case fully establishes it. He is about ten years of age, born of healthy parents (pioneers in the employ of the Public Works Department) who never had the disease, and himself enjoying perfect health till a few months ago, when he happened to mix himself at play with another boy of his own age who was suffering with the disease at the time. The disease broke out in the early and eruptive form, and he is now almost recovered by a course of mercury in combination with iodide of potassium. The villagers are fully aware of the highly contagious nature of the disease, and whenever a case occurs among them, it is usually isolated in a separate hut, and those who have not had the disease are prohibited from any communication with the affected person. This practice I have not observed in this province as much as in Kolonná-kóralé in Sabaragamuwa District.

The usual period in life of the first appearance of the disease is from the second or third year to the age of puberty. It then appears in an eruptive form, the eruptions being hard, knotty and raised above the surrounding skin, and often cluster together, sometimes exhibiting large patches. They vary in size from a pea to a walnut, more or less, seldom ulcerate, and discharge a thin ichor. The eruptions are to be seen most about the hips, thighs, back, elbows, and between the nates, last for about six months and disappear, leaving the patient apparently well, whether by itself or through any of the remedies which the natives employ in these cases I have not been able to determine: but when such cases are treated in hospital they generally recover in a much shorter period. After this many persons remain without any inconvenience from the disease all their life-time, but they shew a peculiarity of appearance and complain of pain in the joints and bones. In a great number of cases, however, especially if the general health becomes vitiated, nodes form in the bones, indolent abscesses form over them, and the latter ultimately result in open ulcers. These ulcers are peculiar, their edges irregular, have a dead pale look, and discharge an ichorous fluid. They cicatrize in some parts whilst breaking up and extending in others, so that frequently the whole extent of a limb is affected in this

manner. These ulcers are almost invariably accompanied with what the patients call "running pains;" which are more severely felt at night than in the daytime, and are often of a most excruciating character. They are described as falling into the ulcer, and when this happens a marked change in the appearance of the latter takes place. The ulcers which are cicatrizing become very irritable and painful, granulations assume a pale flabby aspect, and in some instances shew a tendency to bleed, and the cicatrices which had been formed break up. As the disease advances, to quote the words of my late lamented predecessor here, Dr. Danforth, "symptoms of a formidable nature set in, and all sorts of deformities occur. The nose, palate, and cheeks ulcerate, the nodes terminate in caries, the globular sub-cutaneous tumors soften and break, the fingers and toes mortify, the hands and feet lose their sensibility, while pricking pains are often felt in them, the feet enlarge by the thickening of the tissues, and blebs of various sizes form on them and lead to obstinate ulceration. The general health has of course, ere this become deeply affected. The surface of the body acquires a peculiar clayish color, and a glazy appearance: not unfrequently it is covered with dry scaly epidermis. At length the poor sufferer either sinks from exhaustion, worn out by the pain and discharge, or cut off by diarrhœa or some attack of pulmonary disease."

A mild but very common form of the disease is that known as *Dumas*, that is, the formation of rhagades or fissures round the heels, and the disintegration of the plantar-fascia, giving a honey-comb appearance to the soles of the feet. This is attended with subacute inflammation, and the patients suffer much inconvenience from it, in that it incapacitates them from walking barefooted as they are wont. It is very difficult to cure, and requires a long course of treatment to obtain any beneficial result.

The etiology of the disease is much involved in obscurity, but so far as I have been able to form an opinion of it, the chief if not the sole cause of its development is a cachectic state of the system resulting from the unwholesome food and water which the people in the Parangi-affected villages habitually indulge in, and perhaps to a certain extent aided by the impure air they inhale and the unsanitary habitations in which they live. The disease often remains dormant after its first appearance in young age, as already stated, for an indefinite time, and is called into activity by wounds, ulcers, debility, and occasionally, I have reason to think, by vaccination. There is no question that the unwholesome food and water play an important part in its development, and that is unmistakably shewn by those cases who recover under hospital treatment. In the case of many of them the good effects of the treatment last only so long as they have the means of procuring wholesome food and water, and it is a very common occurrence to see a relapse in patients who return to their respective villages after recovery, and place themselves under the influence of the same conditions which gave rise to the disease in them originally, and come back to hospital for treatment for the second or third time.

It is a curious fact worthy of mention, in considering the etiology of this disease, that wherever it prevails in Ceylon to an inordinate extent, the staple article of food of the people invariably is *kurakkan*, and it is perhaps deserving of enquiry, whether it could be caused in a manner similar to a form of gangrene said to be produced in some parts of the Continent of Europe by the use of diseased rye as an article of dietary, although in some parts of India, where it is largely used by the people as their habitual food, such disease is said to be entirely unknown.

The chief indication in the treatment of Parangi is the improvement of the general health of the patient by a generous and a well-regulated diet. Remedies, though subordinate to it, are of utmost importance in many cases, and the most useful of them are mercury, Iodide of potassium, sarsaparilla, and China root (*Smilax china*) given internally, and ordinary dressings of poultices, carbolic oil, &c., as suited to particular cases.

The preparation of mercury generally used is the perchloride or the corrosive sublimate, and it is often given in conjunction with iodide of potassium, which it then forms an iodide. It is not adapted to all cases, but to a limited class only, such as the early stage of the disease in the eruptive form which occurs in young age. Iodide of potassium is our sheet anchor in this disease, and is given in all stages of the disease with much benefit, and is a remedy *par excellence* for the alleviation of "running pains" Sarsaparilla is a good vehicle for its administration, but of late I employ in its place an infusion of China root, which seems to possess very valuable therapeutical properties for the treatment of this disease. This, though termed a root, is in reality a tuber, and when fractured has a brownish white colour, and contains much starchy matter. It is sold in almost all the bazaars in the Island, and it is said to be imported from China. It is very extensively used by the natives as a remedy for Parangi, and in fact for the cure of ulcers of all sorts including Syphilis. It is not mentioned in the old medical books which are in use among the Sinhalese, and consequently not exactly known how they came to use it in these cases. They might have learnt it from the Chinese themselves, who visited the Island at different periods as traders, or in other capacities; or possibly they were informed of its therapeutic properties by the Portuguese, to whom its employment in Syphilis is said to have been made known at Goa by some Chinese traders about A. D. 1535.

China root acts as a powerful alterative, and is considered by natives as a specific against ulcers, especially of a chronic nature, and involving the bony structure as in those

PARANGI DISEASE.

APPENDIX D

Report of Mr. Av Attygalle.

of Parangi. Its chief therapeutic effect seems to be to lessen the undue secretion of pus from the ulcer, and promote cicatrization. It is used by the natives either alone, in the form of powder, or in combination with mercury. In the employment of the latter remedy the natives do not pay the slightest regard to the idiosyncrasy of the system, and the result is it is often given to excess, and the sufferings many Parangi patients meet with are rather due to the abuse of this drug than to the disease itself.

Subjoined is a statement shewing the number of Parangi cases treated at the hospital here during the year 1877, and the result of that treatment :—

	Discharged.				
Number of cases treated.	Cured.	Relieved	Not relieved.	Died.	Remaining.
137	107	20	2	3	5

It will be seen from the above that the result on the whole is very satisfactory ; the number of patients was not so large as might have been, but this was occasioned by the frequent outbreaks of Cholera in the town, and once in the hospital itself, among some Parangi patients undergoing treatment there, which frightened the timid villagers and kept them away from the station.

I believe much might be done to mitigate the sufferings of the people from this loathsome disease, and even probably in process of time to eradicate it entirely from their midst by the improvement of their modes of living both with respect to food and their habitations. In any measures adopted by Government with that view, the chief consideration should be given to the means by which they may be placed in a position to provide themselves with more wholesome food and water than they now use. The new policy adopted by Government towards this province in the restoration of village tanks and construction of other irrigation works for the encouragement of Padi cultivation, is a step taken in the right direction, and is likely to prove of immense benefit to the people in that respect, and at the same time the chena cultivation, which has proved the ruin of the country in various ways, ought to be discouraged as much as possible.

E.

Report of Mr. A. Maartensz

REPORT on the Parangi Disease in the District of Trincomalee, by Assistant Colonial Surgeon Mr. A. MAARTENSZ.

THE population of the District of Trincomalee is 18,474, out of which 211 are suffering from Parangi and 15 from Leprosy.

Besides the above, several have been admitted, and their history recorded in the register of Parangi disease, of those who came from Anurádhapura district, and the villages adjoining the district of Trincomalee.

Although the number of cases of Parangi, as furnished by the headman, may not be correct, yet, taking the figures as the most approximate, it will appear that very little above one per cent. of the total population of the district is affected.

Yes ; the disease is among the inhabitants.

It is liable to increase by contagion, insufficient and unwholesome food, as owing to frequent droughts crops of paddy fail, and the people are obliged to live on whatever articles of diet they can possibly get, whether wholesome or otherwise. For want of sufficient time to gain experience, it is difficult to say whether the disease is increasing or decreasing. The cases I believe are sporadic and rather continuous. From want of time to visit all the affected villages and to stay sufficient time, I am not able to say positively whether there is any disproportion in the number of males and females, or in the number of children in a family. Average number from enquiry is three or four. From the fact of very young children getting the disease, and the eruption appearing from generation to generation, I am inclined to believe that it is hereditary. Have seen congenital cases, although only one case is recorded.

The dwellings of the inhabitants are generally low, of cadjans, ill-ventilated, and uncleanly kept.

Personal habits generally dirty and careless, that is, although they bathe regularly, yet from want of means they wear the same cloth, lie and work with it for weeks and months together, until by chance they get a clean piece. The patients who seek for admission into hospital come in very often in a state of semi-nudity, with a piece of dirty cloth wrapped round the waist which would appear to have been worn for a long time.

The supply of water depends upon localities. In Mútúr, for instance, there are several wells, the water of which is used for drinking and ablutionary purposes, and men and women, healthy or ill, stand by the side and bathe, the refuse water always returning to the well ; in the case of those affected with the Parangi disease, the water returning into the well is liable to contaminate and act injuriously on the healthy people. In Kinniya, water is obtained from shallow pits dug by the seaside, surrounded by loose sand in

which decayed vegetables are always found, and cattle sometimes get in and refresh themselves; the colour of the water is dirty yellow, evidently from decayed vegetables. In Palamottai in Kattukkulam district, although there are three wells in the village, only one retains water throughout the year; the other two get dry very soon in the year.

It is generally contagious and auto-inoculable; however, I have recorded a case (No. 20) where, although the patient had an ulcer on the foot, the consequence of a wound from a stick, and he had a previous attack of the Parangi disease, and the body was well marked with cicatrices of old ulcers, yet, from the amount of cleanliness observed, nourishing food, protection of the ulcer from exposure and proper treatment, the occurrence of other ulcers have been I think prevented. That the disease is contagious is averred by the patient, yet no other patients in hospital suffering from ulcers, and occupying the same apartment in the hospital and lying near each other, have been attacked.

I have not observed any effect by the clothes.

From the information I have gathered, it does not appear that sexual intercourse necessarily gives rise to the disease; it is communicable from husband to wife and *vice versa* by simple contagion; the sexual organs were not affected. There are instances on record where the parents had not the disease at the birth of the child, yet the latter got it either at infancy or adolescence.

Yes, I think so. An affected person coming into an unaffected village and communicating and living with the people may give rise to the disease; likewise healthy people coming from an unaffected village to an affected one may get it. Cases are recorded.

No; but this may be owing to cleanliness observed, wholesome diet, and the absence of predisposition on the part of the patient in the hospital.

No. May be from absence of predisposition, and cleanliness on the part of the hospital attendants.

Yes, when there is a fissure.

I have not tried, nor heard the people say so; yet the dogs in the villages are generally mangy.

I think it may be communicated by flies carrying the virus from an ulcer of an affected person to an ulcer or broken skin of an unaffected person if exposed. It is probable; but I have not observed this in the hospital.

I think it is.

I think not. All the cases recorded shew that previous to the appearance of the eruption, the patient had a wound from a stick or sores on the feet by working in the fields, where there was a good deal of mud.

There is nothing on record or from my experience to make me believe that the disease can arise spontaneously; on the other hand, I believe certain causes are necessary for its appearance. It must either be inherited or the person must be predisposed, or it must arise by contagion.

The disease may exist and continue its ravages on the body and system for years, until I think it is arrested by change of diet, altered mode of living, cleanliness, and proper treatment; of the cases recorded, there are some of several years' duration.

Yes. Case No. 8 in the register is that of a person in good circumstances and able to live well. I have seen a young woman in Mútúr in Koddiyár district, whose parents were wealthy, and she herself well clad with plenty of jewels about her person, yet she was affected.

The generality of the cases recorded go to shew that the disease attacks once in childhood, and again at adult age.

I think so, if exposed to the contagion.

No. Inquiries even failed to give me any information as to the marriage of close relations.

Disease of the lungs existed with the Parangi in two cases in the hospital. Post-mortem appearance of one is recorded (case No. 31); another case occurred some time ago.

In several instances, the disease by attacking the bones have caused deformity; in some cases patients become emaciated and weak and affected with rheumatic pains of the joints, but I do not think that longevity is affected. One case is recorded (No. 8) of a Moorman who got better when he was seventy years of age; and there is one patient still in hospital blind, with a large ulcer on his leg which never heals, has large scars from Parangi, is upwards of eighty years of age.

I remember one case of Syphilis, who recovered and was discharged, and was subsequently admitted and treated for Parangi. This was some time ago; a case is also on record (No. 22.)

I have not heard of such a thing.

A course of alteratives and tonics, sarsaparilla or quassia with potass iodide, internally. Carbolic oil application to the ulcers. In obstinate cases, mild mercurial ointment, baths, and general cleanliness.

It is amenable to treatment and also curable, I think; those patients who recovered never returned with a fresh attack.

Cases seldom occur in the town, and the town practitioners do not get cases to treat. It is known as Karanthæ, Vycathu, Karupan or Parangi; they know of no varieties.

PARANGI DISEASE.

APPENDIX E.

Report of Mr. A Maartensz.

To improve the circumstances of the people, to enable them to live on more wholesome diet than they can afford at present: to avoid such articles of food as they themselves know to be liable to aggravate, or indirectly to bring out the disease, avoidance of contact, cleanliness, and removal from affected villages. As the number of cases in the district is small, I would suggest the establishment of a Parangi hospital in the central part of the pattu most affected; the hospital need not I think be kept up for more than six months, at an expenditure of seven or eight hundred rupees for maintenance, clothing, and attendants. The very bad or incurable cases may be separated and made to live by themselves.

I think so.

I think it is a variety of syphilitic disease degenerating, in some cases, into Leprosy. The appearance of the eruption corresponds to those described in medical works on skin diseases as Syphilis tertiary; its occurring in some cases after an attack of Syphilis, irritated appearance of the soft palate and fauces, its yielding to mercurials and alteratives, all tend to prove it to be a form of modified Syphilis.

A compound preparation of mercury called by the natives "*pat-pam*," is the general treatment amongst the natives, but beyond the softening of the gums and loosening of the teeth, of which some patients complained, I have no evidence to shew that the disease is aggravated by mercury. Some patients who were admitted into hospital, and who were previously treated with mercury by the natives, had not recovered from the disease.

I cannot answer this from experience.

REMARKS.

The name of the disease seems to be derived from the Tamil name for the Portuguese, and it is a tradition that the disease was imported by the Portuguese. Dr. Loos in his report on the Vanni District makes the same allusion. It may be a form of Spanish pock, and I believe that the eruption was at one time known in English as Spanish-pox, although I am not able at present to find any authority on the subject.

I do not think that the disease is endemic in the villages of Ceylon only. Eruptions agreeing in the appearance, symptoms, causes, and terminations have been described by Military medical officers as occurring in some parts of Asia and Africa; the "Delhi boil" would appear to be a disease much allied to the disease called in Ceylon the "Parangi."

The disease known as "Parangi" in Ceylon may only differ from the above in its not being contagious, but that it is not so, perhaps, may be questioned; yet the form of its first appearance in the form of a pimple or small boil, the length of time it takes to break, the discharge of ichor or sero-purulent matter, the situation on the arms and legs and back, peculiarity of its cicatrization like that after a burn, absence of derangement in the constitution, rather, I believe, tend to prove the disease to be synonymous with "*Parangi*."

The disease affects alike the male and female; it is seldom that it has not made its first appearance at childhood. The history of Parangi shews that it attacks twice, once at childhood, then at adult age; indeed the scars which occurred in childhood still continue. In adult age the least irritation of the skin of the body, as a scratch or wound from a stick, is sufficient to give rise to the eruption. When the disease occurs in adult age, recovery is I believe more protracted, and in many instances it continues through life, and the patients ultimately die of bowel or chest complaint; yet from enquires I have made, I am satisfied that it does not shorten existence. The second attack in females has generally been preceded by obstruction of the menses.

Vaccination, I am glad to report, has not had any injurious effect, and from what I have recorded it will appear that the sore left on the arm after vaccination has not been the cause of the first or second appearance of the eruption; the disease has appeared both before and after vaccination; in short, vaccination neither protects, engenders, nor aggravates the disease. It is however alleged by some natives that children with a vaccinated sore on the arm attending a school where there may be children affected with the disease, flies settling on the body of the affected person are liable to convey the virus to the vaccinated child. This may be possible, yet none of the vaccinated marks shewed that a larger sore than that occurring after vaccination occurred; the marks are circular with minute dots as naturally as the vaccine marks in any other case.

Kurrakkan, sweet pumpkins, and buffalo milk are said by the natives to aggravate, if they are not the cause of the disease; it is a fact that where buffalo milk, in curdled form, called by natives "*ther*," is most consumed, there the disease is mostly prevalent, and the patients themselves admit that they eat a good deal of it. Curdled milk is made by the addition of some acid to the milk, and then warmed, when the milk turns into curds, and when kept for a day or two, as it is generally done, it becomes sour. It is possible that the acid acting on the stomach produces irritation of the skin, and naturally pimples and boils which afterwards break into ulcers; the absence of cleanliness, application of irritating medicines, may cause them to enlarge.

The natives know of no prophylactic against the disease, beyond abstinence from such articles of food as are liable to irritate the skin ("keranthi" food.)

The treatment by the natives is the administration of mercury in a compound form called "pat-pam." This is administered until the gums get affected and the patient salivates,

when they are made to bathe every day. This they say is a certain cure, and when the patient recovers he never gets the disease again; in the meantime the diet is wholly restricted to cow milk and rice. In cases where the treatment has not been properly carried out, or the diet not observed, the disease breaks out again.

Several of the patients who were treated in hospital had been salivated before, yet the disease had not disappeared.

The disease cannot, I think, like cholera or small-pox, be removed in a short time; generations may pass off before it is known that the disease has disappeared.

F.

APPENDIX F.

Report of Mr. Vaitiyalingam

REPORT on Parangi in the Mullaittívu District by Mr. E. VAITIYALINGAM, Assistant Colonial Surgeon.

Parangi prevails throughout the length and breadth of the District of Mullaittívu, but its origin or introduction into the district is not ascertainable, although it is supposed to have been from Portugal or Spain.

All the villages are more or less infected, and no village is known to be free from it. The population consists of two races—Tamils and Moors—and both are affected, but the disease is more common among the former.

According to the last census the population stands thus:—

Maritime Pattus	...	...	6,073
Vanni Pattus	...	...	2,519
Kilakkumálai North	.	.	1,338

Total 9,930, composed of Tamils and Moors, the Tamils predominating in point of numbers, whilst the Moors are very small in comparison. The number of cases in each village is ascertainable only by the headmen. The disease exists always in every village and at all seasons of the year; but the wet weather, particularly the dew season, has a prejudicial influence on the disease, as the patients are generally found with it in its aggravated symptoms during this period of the year.

The disease is now declining, and this may be attributed principally to the working of the civil hospitals established by Government at Vavuṇiya-Viláṇkulam and Mullaittívu, and also to some extent to the fresh air, good food, &c., brought on by village clearing, increased paddy cultivation, &c., introduced amongst the people.

The disease develops itself at varied times; it has no influence over one sex more than another; males and females, infants and youths, adults and old decrepit people, are all alike impregnated with it; and no man, woman, or child is believed to be free from it.

The disease appears to be an hereditary one; many infants suffer from it. There are many causes for the existence of the disease in the Vanni. The people live in villages closely surrounded by thick jungle and where they have no chance of fresh or open air; their habits are very dirty, and they are quite unclean; they do not observe personal cleanliness by washing regularly; they don't get change of clean clothing; they live in low, ill-ventilated houses with a single door for egress and ingress, and no window; the water they use is very unwholesome—they depend always on tank water, which is nothing but a collection of rain water. There is always a rapid growth of luxurious vegetation at the commencement of the winter, and this becomes decomposed in time, and the people use this water which is full of organic matter. If kept for a time, it decomposes and becomes offensive. They bathe in these tanks and take water for drinking also, and it is their habit to go to the tanks with a pot for water, and bathe first, and then take water and go home, and the result by the use of this water can easily be imagined. The healthy and the sick with Parangi all bathe in one and the same place, and even in villages where there are wells the water is dirtied from the manner of bathing.

The disease appears to be a contagious one, and it is communicable by direct contact, and also auto-inoculable by scratching; but I never observed a case communicated by wearing the clothes of the sick.

Parties who were quite healthy have been known to contract the disease by marrying those affected.

As there is not a village in the district free from the disease, no spreading of the disease occurs by the arrival of a sick person with Parangi in a village, but the arrival of a healthy person in a sick village, and his remaining for some time and associating with the sick people, has been known to communicate the disease in several instances.

I have not known any case where the disease has spread among the patients in a ward owing to the admission of a person suffering with the disease.

No attendants or servants are known to have contracted the disease from patients suffering with Parangi.

It is a prevailing opinion among the people that the disease could be communicated to a mother by a suckling child without any abrasion or fissure, but I know of no instance to my knowledge.

PARANGI DISEASE

APPENDIX F.

Report of Mr. Vaitiyalingam.

I have never tried the poison of Parangi on the lower animals by inoculation, and I think the direct contact of the virus is necessary to communicate the disease to another individual, but no sore or abrasion is necessary.

I have known cases in which parties who have had no sore or abrasion, but only lived with the sick, eating and drinking in the same vessel, have contracted the disease, but not as soon as those who have had sores or broken skin.

It cannot be ascertained whether the disease can arise spontaneously, as the enquiry always leads to shew some contact, whether direct or indirect, with the virus. The virus may be introduced into the system without any affection of the genital organs, without sexual intercourse, and without any primary lesion whatever.

It is a prevailing impression among the people that the disease, if left to itself without being interfered with by treatment, would terminate of its own accord with the evolution of certain symptoms, but, if interfered with by giving mercury or other remedies and cut short, it is subject to relapse, and the disease will always remain in the constitution in some form or other. There is no ground for this theory; it is only a mere supposition. The disease, when it gets into the constitution once, is never known to have been eradicated, but remains in some form or other in the constitution, and the remedies regarded as the curative agents are mercury, iodide of potassium, and sarsaparilla, according to the nature and state of the patient and the stage of the disease. A mixture composed of two grains bichloride of mercury and two drachms of iodide of potassium to 24 ounces of infusion sarsaparilla, has been found an excellent mixture for the disease. However, these remedies have a marked effect in removing only certain symptoms of the disease, and produce for a time an apparent cure. Repeated trials in hundreds of cases have clearly shewn that these remedies exert an influence on the general secretory apparatus and promote absorption, and assist in getting rid of many of the morbid results of the disease. The disease has more affinity with syphilitic disease than with any other disorder.

If well-fed and half-starved persons are exposed to the poison of Parangi, the latter contract the disease much sooner and earlier and in the worst form. Persons who are in a cachectic state suffer much from this disease.

Persons who have been cured a second, third, and even fourth time, relapse when they go back to their villages and resume their own mode of living. I made a trial by detaining some patients I cured, in connection with the civil hospital in some occupation or other, where they had good food, good water, and good air; they have had no relapse, but, on the contrary, improved very much in health and were able to do any hard work.

I have never observed any connection with reference to the origin of the disease and the intermarriage of near relatives.

Although organic diseases were not observed to be the antecedent of the eruption, or the eruption to be the result of organic diseases, yet the organs are invariably found to be affected when a person suffers any considerable time with the disease, and the liver is the organ most frequently affected.

In good, strong, and healthy-looking persons, and in those who live in comfort and who observe personal cleanliness, the disease does not as a rule appear in its aggravated form, and when it does, it yields very easily to treatment and does not end in general bad health; but in those who are on the contrary in indigent circumstances, the disease comes in its aggravated form, the constitution becomes cachectic, they become sallow, worn, broken down, and eaten up by the disease, so that although it is not in itself a fatal disease, yet some organic disease supervenes, and the patient dies; and so I am of opinion the disease interferes with the longevity of the person attacked.

I know no instance of a patient who was attacked by Parangi having been attacked by Syphilis, neither *vice versa*.

It is a prevailing opinion that Parangi is a mild or rather a degenerated form of Syphilis, the poison or the virus being in a much diluted state.

No inoculation has ever been tried to my knowledge for the prevention or cure, or for any other purpose.

Under a careful treatment, with good food, &c., relief can always be obtained both in primary, secondary, as well as in the sequelæ; but relapses occur in several instances as stated above, when the patients return to their own mode of living.

A general name "Parangi" or "Kiranthi" disease, is the name given to the disease by the people and practitioners of this place.

It is considered to have a syphilitic taint in it, and it is treated generally with mercurial preparations named "pat-pam." China-root has acquired much reputation for the disease amongst the people, and they give it as a household medicine for the disease without consulting even the native practitioners.

Mercury is very injudiciously given by the native practitioners.

Pat-pam is a compound of mercury, camphor, turmeric, China-root and Shayang-kotte, and it is given twice a day until the mouth is well affected, and then the medicine is discontinued and a cold bath is given every morning very early until the mouth gets better. This is the standard practice of the native doctors.

As I have in my experience very frequently found that patients who have had thorough cures from the hospitals get relapses when they go to their villages and have recourse to their own way of living, therefore nourishing food, good water, and fresh air are the

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APPENDIX F.

Report of Mr. Vaitiyalingam.

principal agents that I would recommend in a great way to obtain the desired effect, with segregation and isolation of the sick.

From my experience I am led to believe that the disease in question and the tertiary form of Syphilis are the one and the same.

I have seen several aggravated cases of Parangi by the improper use of mercury. It is a prevailing opinion among the people and the medical practitioners that Parangi is a syphilitic disease, and mercury is an antidote for it, and therefore they use mercury, but without any consideration at all as to the different stages of the disease; and in cases where the constitution had already been undermined by protracted illness, and where the body is worn and broken down, and where we have recourse to iodide of potassium, sarsaparilla, cod-liver oil, they give mercury. In several instances I have observed cures have been effected by their "pat-pam."

APPENDIX G.

Report of Mr. Modder.

REPORT on Parangi Disease by Sub-Assistant Colonial Surgeon Mr. EUGENE ELLIS MODDER.

THE Parangi disease prevails to some extent in the Chilaw district. It is found to exist more in the villages situated at a distance from the town than those which are near it. I do not think that it is persistent; but from what I have seen of the disease in this district, I am of opinion that it is on the decrease. The decrease is attributable to various causes: to the opening of roads, which to a certain extent make the villages to rise to some importance, as well as to people from other districts coming to settle in these villages, and to the improvement of their habits and mode of living. The disease does not appear in a sporadic form, nor is it epidemic, but the source of contagion could be traced in some cases, and in others a hereditary predisposition exists. It attacks alike persons of both sexes. In some instances, in families where there are several children, the disease appears in one or two at one time, but the others suffer at a later stage, and others are altogether exempted. I could only account for this by stating the predisposition to the disease exists in all these cases, but an exciting cause is required, which will make the disease to appear sooner in the one case, and delay its occurrence in the other.

The number of children to a family varies, the average being about four. In my opinion, Parangi is a hereditary disease. I have never seen a congenital case; but many instances have come under my observation, where it had appeared during infancy and childhood. It first occurs in the form of a sore; very often the patient tells you that he had a wound or an injury about the part where the sore formed; the sore continues for some time (for a period varying from three to five months), when it either heals of its own accord, without the application of any medicinal substance, or after some application is used. About this time the patient begins to suffer from pains in the joints as well as the bones. Fever occurs: in some instances it is very severe in character (the temperature being 99°, and sometimes rising as high as 100° or 102° in the evening); it is comparatively slight in others.

The fever is attended with constitutional disturbance; it remains for about two or three days, when a crop of eruptions, papular in character, appear about the different parts of the body, beginning at the face, and gradually extending downwards; these papules vary in size from that of a pepper-corn upwards. The cuticle covering then gets raised, and they contain a fluid which is at first transparent and gradually gets turbid; shortly afterwards scabs begin to form, and when these are removed small ulcers are found situated below them.

In persons affected with the milder form of the disease, the eruption does not go on so far as the ulcerative stage, but the scabs drop off, leaving a mere discoloration of the skin, which disappears after a time; but when the disease occurs in a severe form, the ulcers begin to enlarge and remain stationary for sometime, but, if placed under proper treatment, these ulcers heal. At a still later period the patient begins to suffer in his general health; he begins to get anæmic, and also suffers from pains, especially about the bones situated under the skin, such as the tibia, the ulna, and sometimes the bones of the head; after a short time nodes begin to form, and these ulcerate, leaving portions of the bones exposed. At about this time tubercles appear, which gradually ulcerate and spread about the different parts of the body; these ulcers are superficial, and in the majority of cases do not extend below the surface of the true skin. In most of the cases these ulcers heal in one direction while they spread in the other; they have ragged edges, the surface is either irritable or indolent, and the discharge serous or sero-sanguineous; when these ulcers are situated about the face, they destroy portions of the nose and sometimes even the eyelids and lips. And when the healing process goes on, by the contraction of the skin, caused by the cicatrix, the eyelids are sometimes drawn downwards, making the patient look quite disfigured. When the ulceration takes place about the extremities, it is followed by the contraction of the toes and fingers, and when it occurs about the neighbourhood of the large joints, such as the knee, the ankle, the shoulder, and the elbow, it is followed by anchylosis, brought on by the parts being kept in one position when the ulcer cicatrizes.

PARANGI DISEASE.

APPENDIX G.

Report of Mr. Maddet.

The people in this district live in huts built of sticks and mud and thatched with cadjans or straw. These huts, as a rule, are not properly ventilated, and are kept in a very filthy state. They do not pay any attention to the clothing they wear; perhaps these cloths are not washed for months together.

They live principally on yams of different kinds, kurakkan and other fine grain, and rice occasionally. Besides these, venison and jungle herbs of various kinds, as well as fish, form the principal articles of diet. They resort to some pond or tank for their water-supply, and the water so obtained is not of very good quality.

The Parangi disease is a contagious one. Most of the cases that have come under my observation were said to have been caused by direct contact with a person already affected with it.

I have never known the disease to occur among the patients in a hospital owing to the admission of a person suffering from Parangi; perhaps this is owing to care being taken to separate such cases from the others in the ward. Nor have I known an instance where the attendants in a hospital contracted the disease from patients. A child may communicate the disease to the breast of the mother when sucking, provided there is a fissure. I have never tried to communicate the disease by inoculation to the lower animals; I am not in a position to answer this question.

The Parangi disease can only be communicated by direct contact with the virus, and it is always necessary that the matter should come in contact with a sore or abraded surface. The disease cannot arise spontaneously; it runs a definite course; but the duration varies with the habits and mode of living, the food, as well as the health of the patient, previous to the occurrence of the disease.

For the same reason it will be found that it will alike attack the well-fed and the half-starved, if both are equally exposed to the same conditions, but the severity of the disease will be modified in the one case and increases in the other. I have never known it to occur among persons living in comfort and observing habits of personal cleanliness, but this may be owing to their not being exposed to the influence of the disease.

Parangi does not attack a person more than once in his life-time, nor is it liable to recur. I have not been able to trace any connection with reference to the origin of the disease and the intermarriage of near relations, nor have I found the eruption to exist in connection with the disease of any organ.

During the eruptive stage the general health is not affected at all; but during the later stages of the disease, the patient suffers in his general health by the excessive discharges consequent upon ulcers found about the different parts of the body.

I have never had a case under my treatment of a person who was attacked with Syphilis suffering from Parangi, nor have I seen the case of a person, who had previously suffered from Parangi, with Syphilis.

Inoculation is not practised for the prevention or cure of the disease by the people here.

The following is the treatment I adopt in these cases.

During the first stage of the disease, when it is purely local, the internal administration of iodide of potassium, either alone, or combined with the iodide of iron when there is tendency to anæmia, with the local application of nitric acid, the nitrate of silver, or some other caustic, followed by stimulating lotions such as the sulphates of copper or zinc. If the caustic be properly applied and at an early stage, I think it would prevent the further progress of the disease.

During the febrile stage, diuretics and diaphoretics, combined with occasionally a dose of quinine, and now and again a saline aperient, are all that is required. After the eruption has appeared, the febrile symptoms subsided, iodide of potassium is the only medicine which I have found to be good. In most of the cases when I have used the medicine at an early stage, I found that it has the power of preventing the eruption appearing, and if it be used after it has come out, it entirely removes the eruption.

The patient is made to bathe in warm water daily, and soap is freely used. Carbolic oil is next applied to the eruption; and I may here mention that I found the ointment of the nitrate of mercury do much good in some cases.

During that stage of the disease when tubercles form about the different parts of the body, and the bones begin to get affected, iodide of potassium internally, and the tincture or the ointment of iodine applied locally, is found to do much good. Sometimes the nodes do not disappear even after the application of iodine. Blisters are of great service.

When the tubercles and nodes begin to soften and ulcerate, and the patient's general health begins to get affected, the iodide of potassium cannot be used by itself, but great advantage is derived by combining it with the iodide of iron. In this stage carbolic acid, either in the form of lotion or mixed with oil, applied to these ulcers, is found to be of great service. In like manner the lotions of the sulphates of zinc and copper, or the sugar of lead and opium lotion, and sometimes nitric acid with opium in the form of lotion, may be used with advantage. In some cases these lotions, even when continued for some time, do not produce the desired effect. An ointment composed of cod-liver oil and liquor potassæ, and sometimes an ointment made of the extract of belladonna, alum, and lard, was found to succeed in effecting a cure.

PARANGI DISEASE.

APPENDIX G.

Report of Mr Modder.

The disease is treated by vedarálas in this district; in fact, it is but seldom that the patients seek to gain admission into the hospital, or to be treated as out-door patients, without being first under the treatment of vedarálas. They, as a rule, use mercury, locally as well as internally, and I have known instances where patients have been salivated more than three or four times, without deriving any benefit whatever. The disease is known to the vedarálas by the name of "Parangi-leda," but they also give different other names, such as "Oḍḍi Parangi," where a node ulcerates and leaves a sinus.

When sores begin to form about the soles of the feet, or the skin or the sole of the foot gets cracked, and ulcerates, it is called "Dumas." When the nose gets affected, it is called "Pínas Rógé." "Alu Parangi" is a scaly eruption found about the different parts of the body, but when there are only one or two patches, and these get raised above the level of the surrounding skin, it is then known as "Dada Parangi." When the glands about the different parts of the body are affected, or when tubercles form, they are called "Geṭa or Gaḍi Parangi." "Aramana-wana Parangi," where a sore forms and remains without healing for some time.

The prophylactic measures which I would recommend are, isolation of the sick where it is practicable. This is done to a certain extent by the people in the villages themselves. A patient suffering from Parangi is at once removed to a distance from the house, a small shed is put up for the purpose, and he is there kept and treated by the vedarálas. This practice is I hear carried on for series of years in this district; but this alone will not do, for if such patients, after they once recover, be allowed to go about with those who have not suffered from the disease, and if attention be not paid to their food and clothing, the disease may break out again, and be communicated to others.

I am strongly of opinion that compulsory segregation and isolation of the sick, if carried out, would have the effect of stamping out the disease from the district.

From all that I have already said on the subject, it will be seen that "Parangi" is a distinct disease, *sui generis*; it is neither a modified form of Syphilis, nor a leprous, nor a cachectic disease.

I have seen the disease aggravated by improper treatment, such as the abuse of mercury, and it is in this state that I find most of the cases when they come to me for treatment. I find that the disease is modified to a certain extent in the course of other disorders, such as small-pox.

One case which came under my observation, where the patient suffering with a primary sore "Parangi" was attacked with small-pox, and some of the vesicles, I found, did not heal, but went through the different stages, that the eruption in Parangi undergoes. In this case the patient was treated with iodide of potassium, and after taking it for some time every trace of the eruption disappeared.

I have not seen a case where a person was vaccinated, and where the Parangi eruption ran its course, during the time the vaccine vesicles were present; but I have known of instances where persons having no predisposition whatever to the Parangi disease, had suffered from it, some time after they were vaccinated.

The eruption is modified to a certain extent in the case of a pregnant woman, but soon after confinement it comes on in an aggravated form.

H.

APPENDIX H.

List of Works on Medicine.

LIST of WORKS on MEDICINE in use among the Siṇhalese.

Sir William Jones, the celebrated Oriental scholar, asserted "that there is no evidence that in any language of Asia there exists one original treatise on medicine as a science;" and Mills, the historian of India, makes a similar statement.

I believe the researches of Professor Wilson, Drs. Hugue, Ainslie, Boyle and Wise, have disproved these assertions as regards India, but there can be no doubt that the treatises on medicine in use amongst the Siṇhalese are merely translations from the Sanscrit, and are in no case original compositions.

The following are the books on medicine and kindred subjects in use among the native medical practitioners of Ceylon:—

I.—*Books containing the Names of Medical Plants, Herbs, &c.*

1. Vásudéva Nighanḍu, වසුදෙව නිඝණ්ටු.—An Indian work containing a description of the medicinal plants and their qualities.
2. Ṣarasvatí Nighanḍu, සරස්වති නිඝණ්ටු —An abridgement of the above apparently
3. Námavali Nighanḍu, නාමාවලි නිඝණ්ටු —Names of plants, &c. composed in Ceylon
4. Sára Nighanḍu, සාර නිඝණ්ටු.—Contains the names of the most important articles used in medicine
5. Dhanvantarí Nighanḍu, ධන්වන්තරි නිඝණ්ටු.—A Sanscrit work of great antiquity of the same nature as above—very scarce.

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II.—*Books relating to the Nature and Symptoms of Diseases, and to the Anatomy of the Human Frame.*

1. Arista Sataké, අරිෂ්ට සතකය.—This is a work of few pages containing about hundred Sanscrit stanzas, treating chiefly of the symptoms of the diseases commonly met with. It has a Siṇhalese translation, and it is one of the first books put into the hands of a native medical student.
2. Mádhawa Nidánné, මාධව නිදානය.—An Indian work, but in great repute among the Siṇhalese medical men. It is considered the chief authority on everything connected with symptology and etiology of disease. Has been lately printed in Siṇhalese characters with a translation in the same language under the auspices of the Pandit, Baṭuwantuḍáwé.
3. Sussrute, සුශ්‍රුතය.—This is the well-known work in medicine used by the Hindoos. The composition of it is supposed to be about the year 1000 B.C. It has six divisions, treating on surgery, nosology, anatomy, therapeutics, toxicology, and local diseases of the ear, eye, &c. Of late this work has come to be used greatly by the native doctors, and there is hardly a native doctor of any intelligence who does not possess a printed copy of it.
4. Charaké, චරකය.—Only a portion of this old Indian work is now extant in Ceylon. It relates to anatomy and is known as *Sareerasthana*. This book is of an older date than Sussrute.
5. Sárangadharé, සාරඟධරය.—A work treating on nosology, general principles of medicine, and diseases of the ear and eye.

III.—*Books treating on the Qualities and Properties of Medicinal Plants and Preparation of Metallic Drugs.*

1. Gunapádé, ගුණපාඨය.—Has about 700 stanzas, and treats of different qualities of various drugs.
2. Siddhausadha Nighandu, සිද්ධවුසධ නිඝණ්ටු.—Contains about 381 verses treating on the qualities and mode of preparing medicine.
3. Rasa Ratnákaré, රසරත්නාකරය.—Treats on the preparation of metallic drugs.

IV.—Books on the Nature and Cure of Diseases.

1. Sárártha Saṇgrahaya, සාරාර්ථ සංග්‍රහය.—The oldest book on medicine of those written in Ceylon now extant. It was composed by King Buddadassa who reigned at Anurádhapura from 339 to 410 A.D. He was reputed to be the most learned in the healing art in his time, and he is said to have effected most wonderful cures, some of which, such as opening the skull and removing tadpoles from it, are too absurd to be believed. His book is written mainly in Siṇhalese, but frequently interspersed with Sanscrit quotations, and the arrangement of the subject is not unlike that of the Indian works Sussrute, &c.
2. Yógárnawé, යෝගාර්ණවය.—Written in old Siṇhalese prose by a priest who lived at Anurádhapura. The reverend author's name was Mayura Pada, and the date of its composition is given as 1219. It treats chiefly of the various combinations of drugs used in different diseases, and the treatment of the latter.
3. Waravóga Sáré, වරවෝගසාරය.—Very similar to the above, but in more frequent use among the Siṇhalese doctors. Neither the date of its composition nor the author's name is known.
4. Maṇjusé, මංජුසය. This is one of the standard works in use among the native medical men. It was written by a Buddhist priest, Atta Dasse, of Parakumbura, who resided in Attanagalu Vihára in Siyané-kóralé about the year 1267, reign of Prákkrama Báhu. It treats of the nature of remedies employed in disease, the mode of their exhibition, especially in the case of vegetable drugs, the description of different diseases, with their respective symptoms. In fact, it embraces the whole system of native medicine except the diseases relating to women, which the reverend author says he has purposely omitted as being unsuited to be treated by men of his order for whose use the book was intended. It is said to have been composed after consulting sixty-three different medical works then in existence, but most of these are now lost and known only by name. It was originally written in Páli gátás, of which there are over 5,000, but a Siṇhalese translation has been added to it subsequently.
5. Sára Saṇsépaya, සාරසංක්ෂේපය.—An Indian work, lately printed with a Siṇhalese translation, contains over a thousand stanzas, and is similar to Maṇjusé, but treats only of diseases and their treatment.
6. Sárasaṇgrahaya, සාරසංග්‍රහය. } Both Indian works rare in Ceylon.
7. Vaiddiya Amurté, වෛද්‍යඇමුර්තය. }
8. Chintámani, චින්තාමණි.—There are several works by this name, all of Indian origin, viz.: (A) *Vaidiya Chintámani* said to have been composed by Dhanwantarí, and treats of pulse, fevers, spasmodic and nervous affections, derangements of the urinary organs not met with in Ceylon at the present day; (B) *Vaidiya Chintámani* written by Vullebundrah, a general treatise on disease and their remedies; (C) *Arogya Chintámani*, a work on medicine, by Pandit Damodere; *Chamuteara Chintámani*, a manual for the treatment of many diseases, and written by Góvinda Rájah.
9. Yógaratnákaré, යෝගරත්නාකරය.—A work on medicine in Siṇhalese, written about the latter end of the 16th century, and its authorship is attributed to the famous Toṭagamuwa, the greatest poet ever Ceylon produced, but the diction is very unlike

his. The book is arranged on the plan of Manjusé and other earlier works, and may be said to treat of the whole system of medicine as known to the natives. It is apparently a collation from several books both of Indian and Ceylon origin, and is much used by the native doctors. In this book for the first time we meet with the mention of the disease *Parangi* by name in any of the standard works on medicine that are in use among the Sinhalese. It gives no description of the disease or its causation, but simply details some prescriptions for its treatment.

10. Vaidyálaṅkáraya, වෛද්‍යාලංකාරය.—A Sanskrit work of 278
11. Yógapiṭaké, යෝගපිටකේ.—A work written in Ceylon.
12. Kalavéda, කලවේද.—A work written in Ceylon.
13. Lakshaṇa Jayadéwé, ලක්ෂණ ජයදේවේ.—An Indian work.
14. Bhaisajjakalpaya, භෛෂජ්‍යකල්පය.—An Indian work in great repute among the Sinhalese doctors
15. Yogadhárané, යෝගධාරණේ.—A Sinhalese work of about 100 verses containing a few select prescriptions for each of the known diseases, written by a man of Mátara District, about 100 years ago
16. Yóga Śataké, යෝග ශතකේ.—An Indian composition by one Varænchi It has 100 stanzas (Sanskrit) detailing select prescriptions for the cure of various diseases.
17. Satasslóké, සතස්ලෝකේ.—An ancient work about 100 stanzas, detailing some select prescriptions for many of the diseases, and much like *Yógasataké*.
18. Bhaisajja Sárárthé Sangrahaya, භෛෂජ්‍ය සාරාර්ථ සංග්‍රහය.—This book is a compilation made by one Don Simon Tillekeratne Abeyewardene, about a hundred years ago or early part of the present century. He was the Mudaliyár of Kandaboda-pattu of Mátara, and is said to have made three copies of the book, of which only the one retained by him, and now in the possession of his grandson, the present intelligent President of the Village Council at Weligama, is now extant.
19. Kámaratnaya, කාමරත්නය.—An Indian work which treats chiefly of the diseases relating to genital organs and their treatment. It is very rare in Ceylon, and a copy is in the possession of the Ganégoḍa Mohoṭṭála in Sabaragamuwa District.

V.—*Books not extant now, but are known by name and are referred to in Manjusé and other Works on Medicine in use among the Sinhalese.*

1.	Náráyané	20.	Jalukanniya.	38.	Payóga Ratnákaré.
2.	Kéwaratana Málaya.	21	Védehiya	39	Hirannakkhiya.
3.	Amitapphabaya.	21a.	Bhisakka Mutthi	40.	Kaccáyannaya.
4.	Prayóga Ratnávaliya	22	Jikeeclamate.	41.	Payóga Kósé
5.	Tikichcha Kálika.	23.	Kassapiya	42.	Cakkhusénaya.
6.	Báhataya.	24	Kankayanya.	43.	Amalanjah.
7.	Attaheyya Satthe.	25.	Sakkamaté.	44.	Haricande.
8.	Amatamálaya.	26	Dabbávali	45	Orabbhe.
9.	Kasakhé.	27.	Alambaniya	46.	Yógamata.
10	Hárite.	28	Patasuddhiya	47.	Bharabvajiya.
11.	Mahayáné.	29.	Payogarnawe.	48.	Amatadharaya.
12	Kharanado.	30	Kanhapurane.	49.	Yógatósé.
13.	Mahakassapi.	31.	Múlagamé.	50.	Bindusáre.
14.	Kharapanya	32.	Hete.	51.	Atthanga Sangrahé.
15.	Chandate	33.	Bhalluké	52.	Rógáyatana Samuccaya.
16.	Assita Sanhitá.	34.	Buddhavédahé.	53.	Vijayarakshita Tíka.
17	Bhójarajjiya	35.	Yógaratna Samuccaya.	54	Chakradatte.
18.	Siddhiyóga Samuccaya.	36.	Nagajjuniya.	55	Dravyaguna Darpane.
19.	Vaddhagaggyin	37	Kumára Sanhitá	56.	Bhaisajja Manemáláwa.*

I.

PAPERS ON YAWS AND SOME ALLIED DISEASES. By GAVIN MILROY, M.D., F R.C.P.

APPENDIX I

Papers on Yaws, &c., by Dr Gavin Milroy.

(Copied from the "Medical Times and Gazette.")

No. I.

November 4, 1876.

THERE is no member of Cullen's class of Cachexiæ ("those diseases which consist in a depraved state of the whole, or of a considerable part, of the habit of the body, without any primary pyrexia or neurosis combined with that state") respecting which the profession is more ignorant than the malady of "Yaws"—the "Pian" of French writers, the "Framboesia" of nosologists. Only four or five years ago the Colonial Office sought the opinion of the College of Physicians on the subject, and the College frankly confessed its inability to answer the appeal.

Unhappily, amid the dearth of real knowledge, some late writers of repute have not hesitated to speak with unwise confidence as to the nature as well as the geographical history of the disease, and by hasty, ill-advised statements have only served to mislead

* This book is mentioned in Ainslie's work on Materia Medica of India as one containing over 1,100 stanzas in use among the Sinhalese doctors, and it is doubtful whether it is extant at the present day.

PARANGI DISEASE.

APPENDIX I.

Papers on Yaws, &c, by Dr. Gavin Milroy.

us further from the truth. No one has more erred in this respect than Dr. Copland in his great work, "The Dictionary of Practical Medicine." Assuming, on most insufficient grounds, that Yaws is a variety or modification of venereal disease, he designates it "African Syphilis;" and he even goes so far as to surmise that the Syphilis of Europe "is derived from, and hence identical with the indigenous Yaws of native Africans." To what mischievous practical results the belief in the syphilitic or syphiloid nature of Yaws and some allied affections has given rise, will be pointed out in the sequel.

With respect to the hitherto widely received opinion of the disease being confined to the West African coast and to the West Indies (the latter country having had it, according to general belief, introduced from the former), it will be seen how extremely doubtful and how misleading this view really is when the actual geography of the malady is duly investigated.

The distinctive characteristic of Yaws is the eruption of raised or tuberculate pustules of a round or ovoid form, which become covered with a yellow or brownish scab or crust, and from which, on the detachment of this crust, there extrudes a raw-flesh fungus, resembling somewhat, by its reddish colour and granulated surface, the appearance of a raspberry *(framboise.)* Hence the term "Frambœsia," and also that of "Yaws," said to be an African word having the same meaning. The fungous excrescence, usually moist on the surface, with a viscid discharge, may vary much in size, colour, and form in different instances, according to its situation, the chronicity of the case, the age of the patient, and the cachexia of the constitution. Sometimes, on the falling off of the crust, the rounded raw-flesh surface is quite smooth and flat, or but little raised above the adjacent skin; or, more rarely, it becomes somewhat hollowed out, the edges being considerably above the level of the centre of the sore. Very generally the raw surfaces, whether protuberant or otherwise, are but little sensitive to the touch, and cause but slight pain or uneasiness on pressure. This feature often serves to assist in distinguishing a Yaw sore from other forms of ulceration. The discharge is usually scanty and of an unhealthy character.

The eruption of Yaws occurs most frequently on the face, neck, shoulders, front of the chest, and the extremities; often also about the pudenda and in the neighbourhood of the anus. The tuberculate pustules are usually single or discrete, but sometimes are clustered together, and occasionally they assume a crescentic or annular arrangement, enclosing in the centre a portion of unaffected skin—the "ringworm yaws" of the West Indies (Bowerbank). In children more especially the eruption often appears as a ring around the mouth, also too around the anus, where "the tubercules sometimes coalesce and form one projecting circular (red) band, an inch or more in breadth (Imray). The throat and inside of the mouth are rarely affected, and only after the disease has long existed.

In many cases of Yaws, and specially when the disease has been long neglected, and the constitution has become much deteriorated, there will frequently be found, besides the pathognomonic eruption now described, other forms of cutaneous disease, varying in character, but all serving to indicate the cachexia and depravement of the whole system. More or less of scaliness and desquamation of the skin is almost invariably present; and besides this, patches of vesiculo-pustular eczema are of not uncommon occurrence, and tend to aggravate greatly the distress of the patient.

In addition to these maladies of the surface, there is very generally in neglected cases a marked tendency to the occurrence of serpiginous ulceration in the seats of Yaw eruption, after the early marks of this eruption have ceased to exist. And then these ulcerations become the most conspicuous features or manifestations of the distemper. Among the earliest cases pointed out to me in the West Indies were several of this sort, the real nature of which I did not at first understand. The following extracts from my report* will probably best convey to the reader some of the various external characters of this somewhat multiform malady as it came under my observation:—

I had been some time in Demerara before an opportunity occurred of my meeting with a case of a distemper which I had often desired to see for myself. The first was in an adult coolie, a patient in one of the ulcer wards of the Colonial Hospital, and was of a mild character. There were several scattered dark spots over the front of the chest and a few on the neck and face, which indicated, I was told, where the Yaw-eruption had been; and there still remained the slightly protuberant raw surfaces of two or three small Yaw-sores on the left cheek, temple, and ear. The next instances were in a poor Negro woman and her two young children, who had been brought by the police to the hospital in a destitute condition, and were all found to have more or less of decided Yaw marks on them. In the mother the most conspicuous symptom was the existence of several red fungoid excrescences on the ankles. On the forearms were numerous large, dark, and raised papules or tubercules, which looked quite dry, and without any appearance of crust or discharge upon their surfaces. The elder child had, besides some large dark stains over the body where Yaw spots had been, an ulcerated surface about the angles of the mouth. In the same out-house was a Creole woman in whom the disease, as pointed out to me, consisted in numerous superficial—at least not deep-seated—irregularly ovoid, unhealthy ulcerations, from one inch and a-half to two inches in length, over the front of the chest.

* "On Leprosy and Yaws in the West Indies." Presented to Parliament, March, 1873.

At Berbice I saw a severe chronic case in an old man in the Almshouse: it was characterised by irregularly circular ulcerations on the lower extremities. The patient was in the same small ward with two cases of Leprosy and two or three other cases of ordinary ulcer.

There were two cases in the out-house ward of the Colonial Hospital at Trinidad—both cases in coolies; one had been of long standing. He had numerous prominent scabby spots over the trunk and extremities, of the size and appearance of small or largish limpet-shells, and covered with dry, darkish crusts, the removal of which (with a probe) exposed a raw surface, sometimes bleeding a little and having a red granulated or slightly fungoid appearance, but with little, if any, purulent discharge on their surface The case had been many months in the hospital, at times considerably improving, and then relapsing. In the other patient, the malady consisted in a large pale ulcerated surface over the front of the ankle and the dorsum of the foot, composed of three irregularly circular superficial ulcers, with raised margins, and showing no tendency to cicatrisation."

Of two cases which I saw in a village a few miles distant from Port of Spain, "one was in a young child, who had Yaws ulceration around the angles of the mouth, and on the nates near the anus. The second was in a middle-aged woman, who had numerous rounded or horseshoe-shaped superficial ulcers on the front of the chest, arms, and legs, having raised margins and large granulations in the centre; some were covered with a yellowish crust or scab." In Jamaica, I saw one case in the Kingston public hospital. "The patient, a woman, had been admitted with Syphilis. There were two or three well-marked Yaw fungous ulcers on the thighs.† In the coolie depôt I saw three Hindus who had been treated for the disease in the Lepers' Home, and had been recently discharged. In one of them several Yaw tubercules, which look like small limpet-shells adhering to the skin, were still to be seen on the body and limbs. In the Lunatic Asylum an inmate was pointed out to me, who was dying from the effects of gangrene of the foot, induced, I was told, by a Yaw ulcer. The patient had repeatedly suffered from Yaw disease at different times before the present attack."

When the sick are left destitute, and the treatment of the disease is either utterly neglected or has been unsuitable and improper, the cachectic ulceration commits sad ravages, and the condition of the sufferers becomes deplorable indeed, as I found to be the case with the numerous patients that had been gathered together from different districts into the hospitals in Dominica. It was in respect of the effects of the disease in that Island that the Colonial Office had found it needful, in the latter part of 1871, to apply for advice from the College of Physicans. From the following passage in my report the reader will best judge of the sequelæ of neglect and mismanagment of the malady:—

It was not till I reached Dominica that I fully understood the gravity of the disease of Yaws in its advanced and aggravated forms When, on my first visit to the hospital at Morne Bruce, near Roseau, I witnessed in many of the patients extensive ulceration of the legs and feet, which had led to the loss of several of the toes or to stiffened wrist and elbow-joints, with other disabling marks of long suffering, the sight was most distressing. Some of the younger children were in a deplorable condition, the victims evidently of starvation and neglect, emaciated to the bone, the limbs seamed with old scars and fresh sores, unable to turn themselves in bed, and requiring to be lifted up to be fed or dressed. As almost all the cases were of long-standing, the primary pustulo-tubercular cutaneous eruption was to be seen in comparatively few of the patients; the dry white scurfiness of the surface (*pian dartre* of French writers) was much more common. On admission the skin was always begrimed with dirt In the case of a poor Hindu youth I saw in the almshouse in George Town, Demerara, besides the surface of the cheeks and extremities being occupied with Yaw scabs, or with the dark marks left by former eruptions, and extreme emaciation, the fingers of both hands were contracted, the left knee also was contracted, and the right one partially so, and the right foot had become everted, the results of scars from old ulcerations.

And now concerning "some allied diseases," alluded to in the title of the present paper.

Soon after writing my report, my attention was incidentally drawn to the "Parangi disease" of Ceylon; its very name had previously been unknown to me. From the perusal of a most interesting and instructive official report, printed by Dr. Loos, Colonial Surgeon, entitled: "Depopulation of the Vanni District," and dated Jaffna, 26th August, 1868, for which I was indebted to the Colonial Office, I was much struck with the resemblance in many respects of the history of the disease with what I had seen of bad chronic cases of Yaws.* Dr. Loos's narrative stands thus, and cannot fail to be read with much interest by the profession in this country, to whom it must be, I presume, quite unknown:

Setting aside the cases which may be easily resolved into well-known forms of skin disease met with everywhere, there is an obscure class of skin diseases, intimately allied and probably

* Dr Ross, one of the surgeons of the hospital, says.—"A case occurred in a child about six months after admission for fracture of the femur It was a well-marked case. Another case of a woman, admitted with Syphilis (primary), who afterwards developed characteristic Yaws on the inner side of the thigh. In this case the Syphilis disappeared rapidly under the usual treatment, but the Yaws took a much longer time The disease did not spread from these cases."—Report, page 60

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having a common origin, prevalent in the interior of Ceylon generally, and more especially in the Vanni, a district in the north of the Island. To this class I would restrict the term "Parangi." The disease is met with in the maritime parts of the Island, but I am satisfied it is there in a mild and modified form, probably from the aggravating causes not being so fully in operation as they are in the interior. It is met with in both sexes and at all ages; the one sex is not more liable to it than the other, and it is equally common at all periods of life. The eruptions are either pustular or tubercular, less frequently scaly The pustules are small, round, and scattered, with an elevated scab, as in Rupia. The tubercules are first hard, but afterwards soften and give exit to pus, and the ulcers formed are apt to be sinuous These frequently run together and larger ulcers are formed, which are liable to spread. The sores are irregular in shape, in some parts deeper than at other parts, covered more or less with yellowish and dark-coloured crusts, the discharge ichorous but not copious. Sometimes the ulcers were found healed in the centre, or were healing in one direction, while they were spreading in another, so that extensive portions of the surface were found cicatrised, while other portions were ulcerated. In children, ulceration was sometimes observed around the lips, and there were many cases of excoriations at the angles of the mouth, sometimes with white discoloration. One child had a large ulcer on the right nates, excavated, with yellow slough; another was in a wretched state of emaciation, with several ulcers on the body and ulceration of the nostrils The eruptions on the children were pustules or tubercules, the summits of which appeared to have a thin mucous lining from which serum exuded, and some had decidedly mucous tubercules (condylomata) near the anus. In older children and adults, nodes and affections of the bones were common, and obviously connected with the progress of the disease. I met with several young people who had become crippled from this cause, and from contraction of the cicatrices of ulcers about the joints. Many also complained of pains in the joints, and it was stated that such pains are often the precursors of the eruptions. Pustular eruptions were found in all parts of the body, including the face. The most common seats of ulceration were the hips, knees, and elbow-joints, but the dorsum of the foot, the back of the wrist and fingers, forearms and legs, were also in many cases ulcerated.

In a valuable report by Dr. Danforth, Assistant Colonial Surgeon, dated January 6, 1873, further particulars are given respecting the outward features of the disease, as he saw it in the Vanni district during a six months' visit to the locality in the previous year :--

It is characterized in its early stages by cutaneous eruptions; Psoriasis is by far the most frequent of these eruptions. It is often associated with fissures of the skin, affecting chiefly the palms of the hands and the soles of the feet. The next in frequency are the tubercules; some of these are small, rounded, hard, and elevated above the level of the skin, developing in small circular groups with healthy skin intervening and forming a small centre to each patch, while others are large, soft, isolated, and little elevated above the surface. These are generally scattered over the whole surface of the body. The vesicular and pustular varieties are not of very common occurrence, and are chiefly found in children of a broken constitution.

As the disease advances ulceration sets in, the ulcers commencing in the cracks and fissures of Psoriasis, or in the tubercules, pustules, and vesicles. Not unfrequently the ulcers originate in boils of a chronic character. The ulcers are often found in all parts of the body, chiefly on the forearms and legs; they are circular, with elevated edges, and spread in every direction, destroying deeply the affected parts. The secretion is an unhealthy pus or a mere watery ichor. Not unfrequently the ulcers are irregular and foul, spreading on one side and healing on the other."

The reader will doubtless have noticed the absence, in the descriptive accounts of the Parangi by Drs. Loos and Danforth, of any distinct mention of the fungous excrescence from the ulcerated surface which constitutes the pathognomonic character of Yaw ulcers in the early stage of that disease. But, curiously enough, this feature is specified in the description given in Mr. Marshall's very interesting work "Medical Topography of Ceylon," published above forty years ago He says :—

Obviously the term *Parangi* is used in an extremely vague sense to denominate all sorts of troublesome or unmanageable cutaneous affections, varying from chronic, squamous, or papulo-pustular eruptions attended with great itchiness and irritation, and with or without a thickened elephantine or tuberculated state of the integuments, to the existence of numerous superficial ulcerations, which are often covered with thick crusts or scabs, or remain open and occasionally *become the seat of a large excrescence*, and which are usually accompanied with severe pains in the joints and frequently also with the formation of tumours or abscesses in different parts of the body."

The characteristic fungus protruding from the Yaw tubercules is a marked feature of the "Coko" disease of Fiji, to which I shall invite the attention of the reader in my next paper.

No. II.

February 17th, 1877.

THE chief aim of my former paper in your Journal (November 4) was, *first*, to invite the attention of medical men generally, and especially of those who are residents in our colonies or elsewhere abroad, or who may professionally visit those countries (as the officers of the Navy do), to the characteristic and distinctive features of the Yaws eruption in the earlier stages of the disease; and, *secondly*, to point out the lamentable sequelæ that are apt to supervene among a poor population when the malady is neglected and mistreated.

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In connection with these objects, I gave some reasons for my belief that the serious endemic of Ceylon, known as the "Parangi disease," and which has long occasioned such grave and fatal consequences in that fine Island, is *allied* to the Yaws of the West Indies; and, at the close of the article, I alluded to the "Coko disease" of Fiji as belonging to the same nosological family. The profession are much indebted to Dr. Macgregor, the chief medical officer of the new colony, for the excellent first report he addressed to the Governor, Sir Arthur Gordon, on December 24, 1875, and a copy of which was received by the College of Physicians from the Colonial Office about the middle of last March. From this very instructive document the following descriptive account of the outward symptoms of this malady is derived :—

The eruption in young children, among whom it most frequently occurs at first about the corners of the mouth and about the fundament, might be mistaken for a commencement of *Herpes;* but it soon appears as if a small soft condyloma was developing itself. It becomes slightly elevated, the epidermis separating from the cutis, and a small quantity of sero-purulent matter gradually forming on the top of the latter, and giving the sore a peculiar whitish-yellow colour. At the same time there is a circumscribed effusion of lymph going on into the cutis, which thus eventually forms tubercules of greater or less size and elevation.

This pustulo-tuberculate eruption may become scattered over the whole body; as a general rule, it is very notably so over the face, round the mouth, nostrils, and eyes, and about the neck. The tubercules are usually of a circular form or elongated, with rounded corners, varying in diameter from two inches downwards, and elevated above the surrounding skin sometimes as much as half an inch. Occasionally they are ring-shaped, with a spot of unaffected skin in the centre, and sometimes, by the coalescence of several contiguous tubercules, an irregular-looking sore may be produced. Individual sores, however, appear to always retain the rounded form.

The characteristic *frambœsoid* fungus or raw-flesh excrescence from some of the tubercules which had become covered with a thin crust, is thus unmistakeably described :—

This crust is easily removed, usually coming off entire like a cap from the top of the tubercule. Beneath it there is a small quantity of purulent matter, through which protrudes what appear to be papillæ of the true skin, very much enlarged, standing up separately, sometimes an eighth of an inch in length, the brightness of their hue appearing in strong contrast with the creamy fluid bathing their almost contiguous bases

That the occurrence of genuine cases of Yaws may occasionally be met with in other countries besides those that have already been mentioned, is rendered more than probable by the following two instances. The *first* was seen in Madeira by Dr. Adams towards the end of last century, and is described in his work on "Morbid Poisons." It occurred in a young Danish nobleman in the Danish Navy, who had been left at Madeira in consequence of his health not permitting him to continue his voyage to the West Indies, from which he had been ten months absent before he felt any indisposition. After some febrile symptoms a pimply eruption broke out over the face, accompanied with inflammation of the throat. The eruption extended over the whole body and the extremities, and the papulæ became pustules The pustules increased in size, and became covered with crusts generally of a light-brownish colour. As the crusts hardened, this gave them the aspect of tubercules; some of them had quite a horny appearance. "On removing the scabs, a fungus, covered sometimes by a thin cuticle, was found shooting out of the foveolus. If in the early stage of the pustule you remove the cuticle, you are to expect a ragged but moist slough. In a later stage, on removal of the scab, you find a fungus, varying in shape, size, and colour, according to the period of the Yaw." The throat affection had also become ulcerative.

The local irritation caused by the numerous sores rendered life scarcely tolerable. Within a month or two from the commencement of the eruption, there were, besides a number of smaller ones, fifty-six large sores, some oval, and being of from two to three inches in their longest diameter. That the case was one of genuine Yaws was attested by Dr. Wright, an experienced West India physician, who happened to be in Madeira at the time. "At the end of six months from the first symptoms of fever, and of four from the eruption, most of the pustules had scaled off, and the throat was nearly well." This satisfactory result seems to have been entirely due to the resources of the patient's constitution, which had merely been supported by suitable food and the exhibition of the mildest medicines. At first mercury had been administered, but, on being found to disagree with the patient's health, its use was soon discontinued, and never resumed.

The *second* case came under my own notice here (Richmond, Surrey) in a personal friend, an elderly gentleman who had been long a resident in this place, and, as far as I am aware, had never, at any period of his life, resided abroad. It was at the beginning of 1873 that I first had an opportunity of partially examining the character of the disease with which he had been for a length of time (one or two years at least, I believe) afflicted. He had been under the treatment of some of the leading dermatologists of the metropolis during this long illness. The following memoranda were jotted down in my note-book at the time :

On the left side of the occiput is a concave or hollowed circular ulcer, between two and three inches in diameter, and at its centre a third of an inch or so below the level of the adjacent scalp. Its surface is unevenly smooth, and looks like raw flesh without any distinct granulations The

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margins or edges are somewhat raised up, and here and there are fungiform. There is a profuse discharge of thin whitish pus, devoid of any offensive smell. The ulcer, although causing great annoyance by interfering with the easy decubitus of the head at night, is not the seat of much pain.

The scalp of the right occiput exhibits several small ulcerated openings with fungoid margins, from which there is a copious similar discharge. Occasionally sharp, transient pains are experienced at some of these ulcerated apertures.

On the top of the centre of the forehead is a round, flat, and smooth raw surface, between a shilling and a florin in size, scarcely above the level of the surrounding skin. It oozes out very little discharge, and is without pain even when touched. It supervened upon the falling off of a dry yellowish crust, which had occupied the spot where the raw-flesh sore is now seen. On the centre of the right cheek is a similar smooth raw surface of the size of a fourpenny-piece. The lobe of the right ear exhibits another spot, which looks like a recently vesicated wound.

Over the front of the thorax are several flat raw sores, all very slightly, if at all, above the level of the adjacent skin, and varying in size from that of a sixpence to that of a florin. One at the apex of the sternum is, especially in the centre, somewhat more prominent than the others. Its surface is nearly dry, the discharge being only sufficient to cause the shirt slightly to adhere if ointment has not been applied. All those raw sores seem to have followed upon the falling off of a dry crust. None of them are sensitive on being touched; but they cause much distress by their moist surfaces being liable to adhere to the linen. There are, I understand (having not had the opportunity of personal inspection), several similar raw sores scattered over the back. I observed one, of the size of a sixpence, at the lower part of the nucha.

Over the head of the right fibula is an irregularly round ulcer, between two or three inches across, from which several fungous protuberances, each as big as a large currant or a small strawberry, stand out close to each other, and in the aggregate form an excrescence which looks like a portion of red cauliflower, projecting more than an inch above the level of the surrounding skin. Its surface is smooth and shining, scarcely moist, and not at all painful when touched.

This ulcer had at first, I was told, consisted of two circular smaller ones, each of about the size of a shilling, and supervening upon the detachment of a yellow crust.

Besides the above symptoms of frambœsial disease, the skin of the face, scalp, body, and limbs has been long, and still continues to be, affected with an eczematous eruption, which has left in various places, especially on the cheeks and scalp, scabby exfoliating crusts, and also with squamous Psoriasis-like patches on the extremities.

The patient's pulse is small and weak, about 90. Although his sleep is uneasy and much broken by the irritation of the skin, his general health is not very seriously disordered, and his appetite is fairly good.

Three months afterwards I found the state of the circular excavated ulcer on the occiput nearly as before. One or two of the round, raw spots on the forehead and scalp exhibited new (as well as I could judge from a very imperfect sight of them), slight, fungus-like granulations on their surfaces.

The ulcer on the right leg, previously occupied with very projecting excrescences, was now rather concave, and somewhat hollowed out in the centre, while the surrounding integuments had become much elevated, with a broad (an inch or so in breadth) and flattened ring of dense reddish induration, which was half an inch at least above the level of the surrounding healthy skin.

The former irritation of the general surface had, the patient remarked to me, for some time much subsided since he had discontinued the medicine which he had been previously taking, and since he had been put by the advice of another medical attendant on a more nourishing diet, with the free use of bottled stout. Although my examination of him was very brief and imperfect, the impression left on my mind was that he had been decidedly loosing ground, and that the case would ere long issue unfavourably.

When I next saw him at the beginning of May, he was much weaker, and his feet and legs had begun to be œdematous. I saw no part but the face, from his being muffled up completely. The nose was much swollen, and seemed to be the seat of purulent exudation all over, and most of the face that could be seen was covered with dry yellowish scabs or crusts. From this date his weakness gradually increased, the œdema became greater, and he sank at length exhausted about the middle of June. I understood from a non-professional friend who continued to visit him to the end, that the occipital bone had become exposed at the bottom of the ulcer in that region for some time before death

To the best of my knowledge, the above is the first recorded case of recognised Yaws disease in this country. Bateman had evidently not met with an instance; for in his "Classical Synopsis" (1824) he remarks that "as it is perhaps never seen in England, a very brief account of it here will be sufficient." I much regret that I had no authentic account of the early phenomena of the eruption, or of the patient's condition of health before and at the time of this occurring. All that I learned from him was that in the summer of 1871 he had begun to suffer from boils in various parts of his body, and that one large and troublesome one occupied one of the cheeks, and that there was another situated on the occiput. It would seem also that about the same time he was affected with an eczematous affection about the face and in other parts. Neither can I state with any confidence what opinion or opinions as to the nature of the disease had been formed by the different medical men under whose care he had been during the two years and upwards that he had been an invalid. The non-professional gentleman, alluded to above,

told me that he had heard the terms "epithelioma" and "cancroid" mentioned in connection with the case. Beyond this I can say nothing. As regards the medicinal treatment during the last six months of the patient's life, I shall briefly allude to it when I come to consider this very important part of my subject.

[November 23, 1878.]

No. III.

THE circumstances which first drew my attention to the consideration of the "Parangi" disease of Ceylon, and which have continued to excite my interest in the subject, may deserve to be recorded, as bearing on the important question of the geography of diseases. In the autumn of 1871 the College of Physicians wrote to the Colonial Office, in reply to a request made by Lord Kimberley, then Secretary of State, for its opinion in respect of the possible risk of Leprosy being ever propagated by vaccine lymph taken from children hereditarily tainted with that disease. This alarm had been suggested in a recent report of Dr. Bakewell, the Vaccinator-General of Trinidad, to the Governor of that colony, who had of course forwarded it to Downing-street.

On receiving the answer of the College,* Lord Kimberley directed that a Circular Despatch (October 16, 1871) be sent to various colonies to ascertain the results of their medical experience in regard to this alleged possibility of the transmission of leprous disease by vaccination. Ceylon was one of these colonies; and among the replies received from that island was one from Dr. Loos, Colonial Surgeon in Colombo, who, after stating that he had never met with any instance where there was "any, even the slightest ground for supposing that Leprosy has been derived from vaccination," goes on to say—"Opinions have been freely expressed in this country that the Parangi disease, endemic here, is capable of being propagated by vaccination, although it has not fallen within my experience that the disease has ever been communicated. As there is, however, a possibility of the disease (deemed contagious in this country) being so communicated, the vaccinators, who are unprofessional persons, are enjoined to select as vaccinifers children who are not only themselves healthy, but whose nearest relatives are free from the affection."

Having been abroad on my mission to the West Indies during the latter half of 1871 and the first half of the next year, I did not see any of the replies to the Circular Despatch until August, 1872. In my reply to the letter from the Colonial Office transmitting these replies, I expressed my entire ignorance of the endemic disease of Ceylon mentioned by Dr. Loos, and my desire for further information respecting it. It was in the summer of 1873 that I received a copy of Dr. Loos's printed report on the "Parangi disease," enclosed in a despatch from Governor Gregory. In my letter acknowledging the receipt of this interesting document I stated: "I have been much struck with the marked analogy in various respects of this Ceylon endemic with the disease of Yaws in the West Indies. Whatever throws light on the one will doubtless serve to elucidate the other."

In the following year (1874), at the request of Dr. Tilbury Fox, who was then engaged on the work prepared by him and Dr. Farquhar, "On Certain Endemic Skin and other Diseases in India and Hot Climates generally," I wrote a brief account of the "Parangi disease," derived from the recent official reports upon the subject by Dr Loos and by Dr. Danforth, the Assistant Colonial Surgeon, and I then took the opportunity of expressing my surmise that the disease might probably be found on further inquiry to be not confined, as hitherto suspected, to Ceylon alone among our Eastern possessions.

"Hitherto, as far as I know," I then remarked, "this form of indigenous cachexy has been only recognised and described in Ceylon, but I strongly suspect that the Parangi disease, or something much akin to it, will be found to exist in many other parts of our Indian Empire, as well as of the East generally. It certainly bears resemblance to some endemic forms of cachectic disease in the Western hemisphere." In the early part of 1875 I received from the Colonial Office copies of several documents relating to the subject. Among these was a letter of Dr. Loos to Governor Gregory, in which he admits that "there are many points of similarity [between the two maladies], and the description of Yaws, as regards its progress and consequences, and the insanitary conditions under which it prevails, would apply in a very striking manner to the endemic disease in this country."

My first paper on "Yaws and some Allied Diseases" appeared in the *Medical Times and Gazette* of November 4, 1876, and the second one in that journal of February 17, 1877. In the latter was given a description of the "Coko disease" of Fiji, from the account of that endemic in the report of Dr. Macgregor, the Government Medical Officer of the new colony, a copy of which was sent to the College of Physicians by the Colonial Office, and wherein the Yaw character of the disease was distinctly recognised.

The latest communication from abroad, bearing on the subject, which I received only a few weeks ago, is the following extract from the recent printed report of Dr. Kynsey,

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* The letter of the College will be found in my "Report on Leprosy and Yaws in the West Indies," page 85

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the Principal Civil Medical Officer and Inspector-General of Hospitals in Ceylon, which appears to be a highly interesting and suggestive document:—

In appendix C., under the head of "Diseases of the Cutaneous System," will be found a term used to designate a disease which has hitherto been supposed to be endemic in and peculiar to this colony. It has been in use by the "vedarálas" or native quacks of the Island since the time of the Portuguese; the word simply means "foreign," and is evidently a corruption of "ferengi." The "vedarálas" include under the term a vast number of different forms of ulceration, simple or specific, and many common skin diseases By some it has been supposed to be syphilitic, by others a form of Leprosy, and by a third a combination of the two.

Cases to the number of 680 are included in the hospital returns of the colony; and on my inspections, wherever I have had an opportunity of studying the disease, I have done so, and I am convinced that a great many totally distinct diseases are included under "Parangi;" I have, however, not yet been able to make up my mind whether there is a disease in Ceylon which cannot be included under one of the names at present known to medical science, or not.

The head-quarters of the disease seem to be Mullaittívu, Vavuṇiya-Viláṇkulam, Kurunégala, Puttalam, Chilaw, and the southern coast from Galle to Tangalla.

I have identified the following diseases returned as "Parangi:"— 1, Lupus and various forms of lupoid ulcerations; 2, Rodent ulcer; 3, Syphilitic ulcerations, attacking the hard and soft palates of the nose; 4, cases of hereditary syphilis; 5 Scrofulous ulceration; and 6 (the most curious fact in connection with my inquiries) I have, I believe, recognized the disease known as Yaws in the West Indies as existing in Ceylon. I was led to this latter discovery by reading the very able report by Dr Gavin Milroy on Leprosy and Yaws in the West Indies, that gentleman's reply to Colonial Surgeon Dr. Loos, forwarded through the Colonial Office, and his contributions on the same subject to the *Medical Times and Gazette*.

I will merely add one remark, in conclusion, that although in the Yaws of Ceylon characteristic elevated rupia-like crusts are well marked, I have up to this failed to find the raspberry-like fungus appearance beneath. After healing, the very dark stains on the dark skin are invariably found. It will be interesting to ascertain if the peculiar scars, cicatrices, contractions of joints, and deformities, so frequently seen in our hospitals in certain districts of the Island, are due to this curious disease, hitherto considered to be unknown in this Island. It will also be strange if the disease is confined to Ceylon, and unknown on the continent of India.

I have been unable hitherto to trace the connexion between the Yaw eruption and its after results, but I have interested several of my officers in the inquiry, and have no doubt I shall be able to report more fully on a future occasion

I may add that, as far as I have been able to ascertain, there seems to be no connexion between the disease, which I consider Yaws, and Syphilis.

In respect of these interesting remarks of Dr. Kynsey, I would observe that although he (and Dr. Loos also, I believe) has hitherto failed to discover the *frambœsoid* fungus in any of the cases of "Parangi" in Ceylon examined by him, the absence of this symptom is by no means unfrequent in many of the old and neglected instances of Yaws in the West Indies, when the disease had passed from its earliest stages and lapsed into the form of aggravated cachexia with diverse morbid sequelæ in the integuments and deeper tissues. This was the case with most of the chronic examples which I met with in Dominica, and such as are described in my report (page 53). It is also to be remembered that the *frambœsoid* appearance of the cutaneous disorder in its early stages is by no means uniformly the same. Dr. Imray of Dominica, in his valuable memoir, contained in my report (page 72 to 83), thus describes it:—

The ordinary Yaw excrescence is not unlike a piece of cotton-wick, a quarter of an inch (more or less) in diameter, dipped in a dirty yellow fluid, and stuck on the skin in a dirty scabby, brownish setting, and projecting to a greater or less extent This comparison is not so elegant as that of a strawberry, but I believe it to be more appropriate to the loathsome eruption, and more exact It is true that there are sometimes red spots or streaks on the yellowish surface of the Yaw fungus, but this appearance, instead of being general, I have only found exceptional."

What Dr. Kynsey says as to the unlikelihood of the Parangi disease being "confined to Ceylon, and unknown on the continent of India," the same thought occurred to my mind, and I had accordingly drawn the attention, at the beginning of the present year, of my friend, Dr. Cunningham, the Sanitary Commissioner with the Government of India, to this very point, in connexion with the large official investigation of Leprosy now being carried on, under his superintendence, throughout the peninsula, and which promises most valuable additions to our knowledge of that disease, and of other forms of cachectic malady among the numerous and widespread populations of that immense region.

One other remark of Dr. Kynsey calls for notice. He remarks that, "As far as I have been able to ascertain, there seems to be no connexion between the disease, which I consider Yaws, and Syphilis." This entirely accords with the conclusion to which I came from my personal observations in regard of the genuine Yaws in the West Indies, viz.: that it is essentially and altogether distinct from Syphilis, contrary to the opinion of Dr. Copland and many other writers, English and French, although it may certainly in some cases be associated and co-existent with this disease; and then the two-fold morbid influences will most seriously aggravate and intensify the deterioration of the general health.

The rightful determination of this question has, of course, most important bearings on the practical *treatment of Yaws*. An immense amount of mischief has unquestionably arisen from the belief that it is of syphilitic origin, and that mercurial preparations must be the proper remedy for its cure and removal. Unfortunately, this belief—which must have been primarily due to medical opinion, and for which, therefore, the latter must be held responsible—has become generally accepted among the uneducated inhabitants of the West India colonies, and hence all the popular nostrums, which are sold in the shops of chemists and other traders for the cure of Yaws consist mainly of this most pernicious drug, when indiscriminately resorted to. As to the proper mode of treating the disease, the remarks of Dr. Bowerbank, of Jamaica, as given in my report (pages 60, 61) appear to me to be most judicious :—

In the primary stage the needed treatment is of the simplest description The patient should be kept within doors in a well-aired room, suitably clothed, have light nourishing food, a daily warm bath, and some simple vegetable tea, as of sarsaparilla, lime leaves, or lemon grass. Exposure to wet and cold must be avoided until the eruption is fairly developed, so as not to run the risk of its being repelled or driven in. When the Yaw tubercles or excrescences are large and full, the skin must be kept clean by daily washing; but no undue friction or handling of the excrescences must be used. When they are flabby and unhealthy, a more nourishing and stimulating diet is required, and the internal use of sulphur, guaiacum, and camphor is beneficial. Mercury is often used to hasten the dispersion of Yaws, but it is always to be very carefully given, and a much safer and quite as effectual remedy is the iodide of potassium. This may be given in any stage. As unwholesome and innutritious food most seriously aggravates the course and progress of the disease, and the want of personal and domestic cleanliness has a like injurious effect, too much attention cannot be paid to the diet and to general hygiene.

Dr. Bowerbank adds the following instructive observations :—

Of all diseases with which I am acquainted, I know none so easily and so seriously affected by external circumstances and injudicious treatment as Yaws. During the earlier stages the eruption is very liable to be repelled or "driven in," as by exposure to cold with insufficient clothing, exposure to night air, or injudicious bathing in the sea or in fresh water, excessive purging, the accession of the different exanthemata or of other acute diseases, the abuse and too early use of mercury.

In persons predisposed to Leprosy, Scrofula, Syphilis, &c., when attacked by Yaws, its course is often irregular and protracted; in fact, the system appears unable to cast off the disease Efforts are made and repeated at long intervals, but sometimes unsuccessfully, till at last the latent disease becomes roused into action, and a most destructive ulcerative process takes place, crippling and deforming the body and at last destroying life.

The history of the two cases, one in Madeira and the other in this country, recorded in my second paper (*Medical Times and Gazette*, February 17, 1877), however imperfect in the details, is significant in respect of the treatment of the disease. In the first case the patient recovered, after the discontinuance of mercury, under "the use of suitable food and the exhibition of the mildest medicines;" while, in the second, the health gave way, and the patient sank in consequence, as I believe, of the protracted and inordinate administration of mercurials.

The general result of my observations in the West Indies is given in my report, page 63, in these words :—

From all the evidence that has been now adduced, we may fairly infer that, although there yet remains much respecting the origin and attributes of Yaws, requiring more accurate investigation than has yet been applied to the subject, everywhere it is fostered, if not engendered, amid poverty and its ordinary accompaniments of squalor and semi-starvation. Proofs of this were given me alike in Berbice, Dominica, and Jamaica Yaws is thus obviously another member of that multiform brood of evil known by the family name of "*mal de misère*."

As to the part which contagion plays in respect of the origin and spread of the disease, this is still ambiguous. I would earnestly suggest to Dr. Kynsey to have his attention especially drawn to this point in regard of the Parangi disease.

Before closing this article, I would invite the notice of the reader to some instructive and very pertinent remarks of Dr. Tilbury Fox on subjects somewhat kindred to what I have been considering in the previous pages :—

We have long been of opinion that several forms of ulcerating furunculoid diseases were the outcome of a cachexia, induced by insanitary influences attached to certain unhealthy climes Before leaving the subject of Delhi sore and its allies, we desire to add a few special observations relative to the general question of endemic cachexia The statements and facts recorded in the preceding section go to show that in many parts of the world, and emphatically so in hot and and unhealthy climates, the nutrition of the body becomes seriously depraved under the influence of various combinations of defective hygiene, bad feeding, malarial and other poisonings, great alternations of temperature and humidity; and certain diseases of the skin, of a more or less ulcerative type, are considered to be developed in consequence. Now, while such endemic diseases exist it is but natural to regard them as peculiar to the localities in which they are observed, and as being induced by causes specially at work therein. But the time has arrived for a fuller recognition of the fact that many of these endemic or indigenous cachectic diseases bear the closest resemblance to each other in their main features, and fall together very naturally into a common group or class of endemic or indigenous cachexiæ; and, moreover, that many of them, supposedly

PARANGI DISEASE.

APPENDIX I.

Papers on Yaws, &c., by Dr. Gavin Milroy.

distinct, are in reality one and the same thing, but are known however under different designations. These remarks apply particularly to "Delhi boil," "Moultan sore," "Aleppo evil," "Biskra button," Yemen and Aden "ulcers"—also to the Parangi disease of Ceylon.

Dr. Geber, of Vienna, at Hebra's suggestion, made a long stay at Aleppo for the purpose of studying the "Aleppo evil," and he concludes that there is no such disease in reality as "Aleppo evil." The many cases of the disease which he saw from time to time were either syphilitic, lupoid, furuncular, or eczematous."*

These observations of Dr. Geber accord in a striking manner with those of Dr. Kynsey in respect of the diverse forms of disease which are grouped together under one general term in Ceylon, viz., "Parangi."

* "On certain Endemic Skin and other Diseases in India and Hot Climates generally." By Tilbury Fox, M.D., and T. Farquhar, M.D., 1876, pages 18 and 21.

IX.—1881.

COLOMBO HARBOUR WORKS.

NAUTICAL OPINIONS

EXPRESSED BY

THE COMMANDERS OF STEAMERS FREQUENTING THE PORT OF COLOMBO

IN REPLY TO A CIRCULAR FROM

THE MASTER ATTENDANT OF COLOMBO.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
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1881.

COLOMBO HARBOUR WORKS.

COLOMBO HARBOUR WORKS.

NAUTICAL OPINIONS

LETTER from the MASTER ATTENDANT, Colombo, to the Hon. the COLONIAL SECRETARY.

No. 18.

Master Attendant's Office,
Colombo, 31st January, 1881.

SIR,—I HAVE the honor to inform you that with the view of obtaining nautical opinions upon the various Harbour schemes proposed for this port, I addressed a letter to such of the Commanders of steamers of the British India Company, and other Companies who had been trading to this port, and who appeared to me to be most competent to give an opinion upon the question, accompanied by a lithographed plan of Colombo shewing the two designs for a close harbour and the single breakwater with curved arm, which Colonel Fyers was good enough to supply me with. I now enclose a copy of my letter to Commanders of steamers, and of the replies which I have received. Several answers have not as yet been received. It will be observed that of the twenty replies I have received, seventeen are in favour of a single breakwater with outer end curved to N.E.; only three are in favour of Sir J. Coode's large close harbour; and all condemn the small close harbour proposed by the Chamber of Commerce.

2.—Although I have supported Colonel Fyers' plan of breakwater in preference to either of the two proposed close harbours, yet, the longer I consider the harbour question the more I am strengthened in the opinion I expressed in my letter No. 68 of the 25th July, 1879, that an extension of Sir J. Coode's breakwater to the point where he proposes to have the western end of his northern arm, would be the best plan to adopt; and I feel confident that if Sir J. Coode were here when the breakwater shall have reached the point where he now proposes to end it, and observed its effect, he would say that a further extension of it for 600 or 1,000 feet in a N.E. direction would be all that is needed to secure the requisite amount of shelter; for the breakwater, even at its present length and without a curved arm, affords considerable shelter from the N.N.W. winds and sea. This is evident from the fact that throughout the unusually strong and protracted "long shore" winds which we have experienced this season, not a single demand has been made upon my Department by the native craft for anchors and cables to secure them from driving on shore; whereas, before the breakwater gave shelter, the anchors and cables of this Department were in constant requisition by the native craft during the "long shore" winds.

3.—The Breakwater has been progressing so rapidly this season, that if it continues to progress at a similar rate, Sir J. Coode may possibly see his way to such a saving on the estimate as would provide a further length of 600 feet for the £800,000 which has been named as the limit of expenditure. In any case, it would be a matter for regret if an additional £50,000, or £100,000, were to stand in the way of making a first class harbour at this port.

I am, &c.,
J. DONNAN,
Master Attendant.

CIRCULAR addressed to the COMMANDERS OF STEAMERS frequenting the Port of Colombo.

Master Attendant's Office,
Colombo, ———, 188 .

To the Commander of the S. S. "———."

SIR,—I HAVE the honor to enclose a copy of a plan of Colombo Harbour shewing three different designs of harbour works:—

1.—The smaller close harbour, colored green, recommended by the Chamber of Commerce;

2.—A single breakwater with the outer end curved round to the N.E., as a protection against the N.N.W. sea caused by the "long shore" wind in the afternoons during December and January, colored yellow, strongly recommended by Colonel Fyers, Surveyor-General, and myself;

3.—The larger close harbour, colored red, recommended by Sir John Coode, Consulting Engineer;

And to request that you will be good enough to favour me with your opinion as to which of the schemes would be the most desirable to adopt for the general requirements of this port; and whether you consider the single breakwater with the curved arm would give sufficient shelter in both monsoons.

I am, &c.,
J. DONNAN,
Master Attendant.

COLOMBO HARBOUR WORKS.

NAUTICAL OPINIONS.

REPLIES FROM COMMANDERS OF STEAMERS REFERRED TO.

1.

B. I. S. N. Co.'s S. S. "Chyebassa,"
Calcutta, October 30th, 1880.

SIR,—I HAVE the honor to acknowledge your despatch of 22nd instant, and plan of Harbour Breakwater, as proposed by various authorities.

Opinion.

Firstly.—Smaller close harbour, colored green, recommended by Chamber of Commerce.—*Unsuitable*, does not afford area for requirements of port. Ships or steamers making entrance in monsoon (S.W.) would require considerable way; hence would jeopardize other ships in the port, if they did not go on shore ere this way was checked. I am also under the impression that this close harbour would entail dredging operations.

Secondly.—Single breakwater, colored yellow, recommended by Colonel Fyers, outer end carried to northward and eastward.—I consider Colonel Fyers' proposition the most suitable, and in every way adapted to the requirements of Colombo. Firstly, it has the merit of affording a wide entrance to the port. Secondly, ships will enter with a beam wind, hence be more under control, and brought more easily into a "crowded anchorage," than if brought through a narrow entrance with following wind and sea. Thirdly, I consider that it will afford all requisite shelter from "long shore" or N.N.W. swell. Fourthly, more easy of access at night than the close harbour proposed.

Third proposition.—Larger close harbour recommended by Sir John Coode, colored red. The next generation can adapt Sir John Coode's plan to that proposed by Col. Fyers. At present I do not consider the supplementary breakwater requisite.

I have, &c.,
F. M. BURKE,
Commander.

2.

B. I. S. N. Co.'s S. S. "Byculla,"
Colombo, November 16th, 1880.

SIR,—I HAVE the honor to acknowledge receipt of your favour of 15th November, enclosing copy of a plan of Colombo Harbour, with reference to which I beg to make the following suggestions.

With regard to the first plan of the small close harbour, as recommended by the Chamber of Commerce, I do not agree; but I should recommend the second plan with a single breakwater carried round to the N.E., and which from the experience that I have had would be a protection against the swell that prevails and the shore winds in the months of December and January. The swell that comes in generally in the S.W. monsoon comes from the south to west and north-west, and which are the only months when a ship does not lie comfortably in the Colombo Harbour.

With reference to the third and larger class of harbour as recommended by Sir John Coode, Consulting Engineer, I should think it would be a great expense to the Government, that could be done away with, and that the second or single breakwater would be much easier for vessels entering and going out of the port, and would be far preferable to either the first or third mentioned in your letter, as it would be much easier of access.

I would further beg to suggest that should it at any time be desirable for the other arm of the breakwater to be required from the shore, that it could be easily done; but I imagine that plan No. 2, as suggested by Colonel Fyers and yourself, will answer every purpose.

I have, &c.,
W. R. MASON,
Commander.

3.

B. I. S. N. Co.'s S. S. "Culna,"
Colombo, 17th November, 1880.

SIR,—IN reply to yours of the 13th instant, I have to state that I am greatly in favour of the single breakwater curved to the N.E. The object will be attained, and a perfect harbour in both monsoons finished in much less time and less expense than by any other method.

I have, &c.,
G. M. BROWN,
Commander.

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4.

B. I. S. N. Co.'s S. S. "Ethiopia,"
Tuticorin, 18th November, 1880.

SIR,—I HAVE the honor to acknowledge receipt of your favour, accompanying copy of a plan of Colombo Harbour shewing three different designs of harbour works, and requesting me to give an opinion as to which it would be most desirable to adopt, with a view to meeting the general requirements of the port.

The first design of Sir John Coode, forming a large close harbour, is, I think, open to several objections: –

1st.—The enormous expense necessary for its completion.

2nd.—The entrance, which would, in a heavy S W. sea and strong current running along the face of the breakwater, be difficult and dangerous to make, even at a high rate of speed, which in itself would be an element of considerable danger on entering a crowded harbour.

3rd.—The opening is to the N N.W., and would during several months of the year admit a very considerable sea, and render a large area useless for cargo work.

The second, or modified design of Sir John Coode is open to the above second and third objections, with a further one in the contracted area available.

The third, or single breakwater suggested by Col. Fyers, is free from the objections mentioned in connection with the two foregoing designs; and would I think meet all the necessary requirements of the port. It would be easy of entrance and egress for steamers and sailing vessels at all seasons, and would I think afford ample protection against the sea caused by a "long shore" wind.

The delineation of the curved portion of the wall might perhaps be improved and extended, but that would be a matter of detail and for professional opinion.

I have, &c.,
J. T. SHARP,
Commander.

5.

B. I. S. N. Co.'s S. S. "Scindia,"
November 24th, 1880.

DEAR SIR, IN reply to your letter referring to the harbour, after carefully considering the matter I think the plan proposed by Colonel Fyers is the best. Vessels entering can do so with a gentle sweep, rounding to head to wind, in a part of the harbour where I think you will be able to gain the most room. Running in between two pier heads must be at all times attended with some risk, especially during the S.W. and N.W. winds, which will be, I presume, the principal winds for which shelter is wanted. With a high sea on a vessel's quarter, she would have to carry good way to enable her to be kept under proper control, and, when inside, require too much space to bring up in.

I have, &c.,
JOHN STONE
Commander.

6.

S. S. "Duke of Devonshire,"
Colombo, December 4th, 1880.

SIR,—WITH reference to the proposed Colombo Harbour Works, I beg to say I quite agree with Sir John Coode's first plan.

Colonel Fyers' plan, in my opinion, would not give sufficient shelter, and the modified plan of Sir John Coode's would make the harbour much too small.

I have, &c.,
W. T. WATERMAN,
Commander.

7.

B. I. S. N. Co.'s S. S. "Dorunda,"
Colombo, 4th December, 1880.

DEAR SIR,—IN answer to your letter of yesterday I beg to state that I have thought over this matter, and decided a year ago that nothing short of a large, commodious, and well-protected harbour will do for Colombo. This will undoubtedly be the port of the future for all Ceylon, and any modification of Sir John Coode's original plan would be a grave error, as it would not only be unsuitable, but would destroy the site for a really good

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harbour; with reference to your second question, I am of opinion that the single breakwater with the curved arm would not give sufficient shelter for rapid discharge and shipment of cargo.

I have, &c.,
A. E. WITHERS,
Commander.

8.

B. I S. N. Co.'s S. S. "Madura,"
Colombo, 8th December, 1880.

DEAR SIR,—I BEG to acknowledge receipt of a plan of Colombo Harbour, shewing the three designs of proposed breakwater; also details of each plan, with a request that I would give you my opinion as to which of them would be most desirable for the port.

After carefully considering the three designs, I emphatically decide in favour of the single breakwater, with the recommendation that it should be continued 800 feet further than shewn in the plan. I am of opinion that any opening to the N.W., as shewn in the other plans, would be a mistake, as the wind and swell would seriously interfere with ships entering from that quarter, from the great difficulty of bringing up in time to avoid collision with ships inside, and it would be absolutely necessary to employ a tug to take ships out. In case of a single breakwater, there would be ample room between the end and the shore for sailing vessels to go in and out under sail without blocking the way.

I am of opinion that the space enclosed by the green-colored design is altogether too limited for the requirements of the port.

The tendency in England appears to be steadily towards increasing the size of steamships, and it would be a great misfortune to find in a few years hence that ships had to anchor outside for want of space inside the breakwater.

I have, &c.,
W. STAVIATT,
Commander.

9.

Colonial Steamer "Serendib,"
Colombo, 13th December, 1880.

SIR,—IN reply to your letter of the 10th December, I have the honor to state that I have never had any doubt whatever as to the plan No. 2 for the breakwater, as recommended by Colonel Fyers and yourself, being the most desirable, and in my opinion quite suitable and sufficient for the wants of the local trade.

When it has been completed with the outer end, and curved to N.E., I consider the shelter will be perfect, not only in the S.W. monsoon, but also in the N.N.W. wind, which prevails in the afternoon during the N.E. monsoon, and which is the wind that brings the heaviest sea at that season. At other times of the day it is well known the inconvenience caused by the swell would be very slight.

I have, &c.,
JAMES WORSLEY,
Commander.

10.

B. I. S. N. Co.'s S. S. "Henzada,"
18th December, 1880.

SIR,—IN reply to your letter of 14th instant, enclosing a plan of Colombo Harbour Works, I have the honor to say that I consider Colonel Fyers' plan to be the one best calculated to protect the harbour.

It might perhaps with advantage be extended a little to increase the size of the anchorage. After a recent experience inside the Madras Harbour Works, I consider any opening left open to the sea as a great mistake. Colonel Fyers' plan only leaves the harbour open to the north, and in that direction the formation of the land precludes the possibility of any sea rolling in.

I have, &c.,
J. L. GRAINGER,
Commander.

11.

B. I. S. N. Co.'s S. S. "Khandalla,"
Galle, 19th December, 1880.

DEAR SIR,—I BEG to acknowledge receipt of your letter and proposed plan of Colombo Harbour. With regard to the three propositions, I beg to state :—

1st.—That the small harbour would be useless for the requirements of the port; it would only be a waste of money for no good.

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2nd.—The breakwater with the curved arm would not give sufficient shelter, as it would leave a large portion of the harbour exposed, so that any swell outside would always find its way in.

I am therefore in favour of the large harbour with two arms, and the entrance brought round as much as possible to the N.E., but not to be in less than five fathoms of water, thus making the harbour enclosed, so that no swell could get in, and the vessels would be in perfectly smooth water.

This would also leave sufficient room from the shore to manœuvre even the longest vessels, and with the usual winds at Colombo, no difficulty would be experienced by sailing vessels leaving or entering the harbour.

The harbour this size would be sufficiently commodious to berth all vessels coming to the port, and at the same time leave a clear channel inside the harbour for vessels to move out or come in; this being absolutely necessary, as a large number of steamers coming to the port will be arriving and leaving at all hours of the day.

I have, &c.,
J. SMITH,
Commander.

12.

B. I. S. N. Co.'s S. S. "Almora,"
Colombo, 3rd January, 1881.

SIR,—I HAVE the honor to acknowledge receipt of your letter of 1st instant, enclosing copy of a plan of Colombo harbour, and in reply beg to inform you that I consider a single breakwater curved round to the N.E., as shewn in plan and colored yellow, would give sufficient shelter, and meet all the requirements of the port, and there would be less difficulty in entering and leaving the port than if obliged to take a vessel through a narrow entrance, as would be necessary if either of other two plans were carried out.

I have, &c.,
C. C. D. HUTCHESON,
Commander.

13.

Mangalore, 8th January, 1881.

SIR,—IN compliance with the request conveyed in your letter of the 21st ultimo, I have the honor to submit my opinion on the three schemes for the harbour at Colombo.

Firstly.—The small close harbour, colored green, on the plan, recommended by the Chamber of Commerce.

In my opinion, this harbour would be too small for the trade and the requirements of the port. Even, allowed that it was sufficiently large to contain all the vessels frequenting the port, or that are ever likely to do so, still they would be so crowded together that there would not be any room left for the necessary traffic and movements of vessels. It is also open to another objection, which I shall point out when dealing with the larger close harbour.

Secondly.—The large close harbour, colored red, recommended by Sir John Coode, Consulting Engineer.

This no doubt would be a fine large harbour sufficiently well-protected by the detached breakwater from all winds, and of ample area inside, but I consider that such a complete and expensive harbour is unnecessary; for the construction of the detached breakwater must necessarily involve a large expenditure.

The harbour would also be open to the grave objection of having a comparatively narrow entrance between the pier ends, which could not be availed of at night, especially in the S.W. monsoon. The heavy rolling in of the sea during the monsoon would make the taking of the harbour at night a very dangerous course to large and unwieldy steamers; the passage of a thousand feet on the shore end of the detached breakwater could not be availed of safely, as large vessels making use of the same would be in dangerous proximity with the rocky point of Mutwal, and there is barely sufficient water for vessels of large draft in the passage.

Thirdly.—The simple breakwater with the outer end curved round to the N.E., proposed by Colonel Fyers, R.E.

I am altogether in favour of this scheme. I think that the bend to the N.E will amply protect the harbour from the N W or "long shore" wind of the afternoon during the fair seasons, and that if the bend was continued some distance further to the N.E., it would no doubt be still more protective against the "long shore" wind, and would still leave ample room for an entrance to the harbour even for the largest of steamers. It could also be used at all times of the day and night, and the monsoon sea would have no effects on the steering of vessels so as to risk their getting foul of the pier head.

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In conclusion, I may state that I have fifteen years' experience of your port in the service of the British India Steam Navigation Company, nine years of which period I have commanded steamers running for the most part on the Bombay coasting line.

I have, &c,

GEO. WICKS,

Port Officer, Mangalore, late Commander S. S. "Ethiopia."

14.

B. I. S. N. Co.'s S. S. "Africa,"
Colombo, 12th January, 1881.

SIR,—I HAVE the honor, in reply to your letter with the different plans of Colombo Harbour, to inform you that, in my opinion, breakwater No. 2, or the curved arm proposed by Colonel Fyers, R.E., would be the most efficient for the harbour, for the following reasons :

1st.—That there would be no danger of the water getting stagnant, as the tides and currents would have free passage in and out.

2nd.—There would be more room for vessels entering and leaving the port, and the S.W. sea would be more regular at the large entrance, therefore making it easy for steamers leaving the port on dark nights during the S.W. monsoon.

3rd.—During the so-called N.E. monsoon the wind is generally to the westward of N., and any little motion of the water during December and January ought not to interfere with the working of vessels, as the curved arm is to the eastward of N.

I have, &c.,

J. ANDERSON,
Commander.

15.

Malta, December 24th, 1880.

SIR,—I HAVE the honor to acknowledge your letter of the 4th instant, with enclosed plan shewing three different designs of proposed Harbour works for Colombo :

1st.—Small close harbour recommended by Chamber of Commerce ;
2nd.—Single breakwater with outer arm curved to the N.E., recommended by Colonel Fyers ;
3rd.—Larger closed harbour recommended by Sir John Coode.

The two closed harbours having their entrance to the N.W., I should consider a great drawback, especially in the S.W. monsoon. As steamers taking this harbour would have to steam in with (at times) a heavy beam sea and northerly current, and as ships would have to steam in very slowly, I do not think it would be an easy matter to keep them under command. At such times I fear it would be necessary to have a steam tug or check to keep the vessel's quarter to windward or in the fairway entrance. This would necessarily cause much delay and loss of time, which ought to be avoided if possible.

With regard to the single breakwater with outer arm curved to the N.E., recommended by Colonel Fyers, R.E., I would say have the arm extended about one cable's length further to the N.E. It would serve all the requirements of the port of Colombo and afford sufficient shelter from wind and sea all the year round, and have many advantages over a closed harbour ; such as no difficulty in entering or leaving, as the very largest steamers would have ample sea room between the pier head on the N.E. arm of the breakwater and the four fathom line of soundings, and would be able to steam into the harbour in not less than five fathoms of water without any risk, and pick up a mooring buoy without loss of time, risk of collision, or assistance from any other power than that of her own engines.

I have, &c.,

J. J. BALLANTINE,
Commander S. S. "Merkara."

16.

S. S. "Vega,"
December 28th, 1880.

SIR,—I DULY received your letter, together with the plan of Colombo Harbour, on the 24th instant. Having no time during my short stay to reply, I now take the pleasure of complying with your request. You are aware that I have visited your port at all times and seasons of the year, many of those being at the most stormy periods, entering and leaving both by day and night in steamers and sailing vessels. I offer the following opinions with a deference, hoping it may help you to decide on the most sheltered and

suitable plan for the requirements, present and prospective, both in the interests of passengers, shippers, and shipping interests.

1st.—The small closed harbour would not be available in stormy weathers.

2nd.—For an entrance as suggested in the plan: (1) no vessels would enter or leave after dark in the S.W. monsoons. (2) Sailing vessels could never leave without steam. (3) The Isaure ledge fronting it, would be a grave objection. (4) It would allow a heavy swell to come in, and so prevent vessels laying along-side, that being the quickest and most economical way of discharge or lading. (5) Vessels would have to enter at a speed dangerous to their safety, and would probably collide with other vessels in the port, or part their cables attempting to bring up, and so consequently take the ground.

3rd.—From a sanitary point of view, by stopping the current from doing what has, I believe, been the case since the extension of the breakwater to its present extent—*i.e.*, to scour and deepen the water, (1) It would become a stagnant pool too unhealthy to live near. 2) It would rapidly silt up, especially round the shore and walls. (3) It would require constant dredging and expense, and without great care in dredging the walls may be undermined, the result being that vessels would not be able to get near the shore. (4) The only available part then would be the centre, directly in the way, and so block the traffic.

4th —(1) I think a single breakwater curved to the N.E. the best for all purposes. (2) It would allow a good entrance, and is suitable for departure by day or night for both steamers and sailing vessels, and will almost always afford shelter. (3) It will certainly protect the shipping in the S.W. monsoon, and sufficiently in N.W. winds, the latter being the only time it may not afford shelter to lay alongside. (4) Should it be found necessary, an arm somewhere from Mutwal Point would seem to me the best. (5) This would be an after consideration, when you have experienced as to its necessity. (6) It would be a commodious harbour and give you ample room to accommodate the trade of your port, present and prospective, and will cost less than the closed harbour schemes, the one colored green and red. (7) The arms of both do not seem suitable to protect the harbour from N. or N.W. winds, and would both admit a swell and require constant dredging and expense, as before stated, and could not be entered in stormy weather save at great risk.

I am,

CHAS. SMERDON,
Commander.

17.

S. S. "Eldorado,"
Colombo, 22nd January, 1881.

SIR,—I HAVE the honor to report for your information, that I have very carefully considered the plan of Colombo Harbour showing three different designs of harbour works, and I am of opinion that the plan (No. 2), recommended by Colonel Fyers and yourself is the most desirable, but, in addition to this, I think a short arm from the shore quite necessary to prevent silting. This arm need not be carried far out, and might be composed of blocks of stone thrown down, allowing them to find their own place, like the breakwater at Port Said and many others in Europe.

My reasons for arriving at this opinion are as follows:—

The harbour recommended by the Chamber of Commerce is not large enough for the requirements of the port, even though the dredging be successfully carried out; and of this I may remark *en passant* I have very grave doubts. I have just left Madras harbour, where there were four other steamers beside my own (none exceeding 1,500 tons except the "Eldorado") and two or three small country crafts, and there is little room for more until the mooring buoys be laid down.

I have frequently seen treble that number in Colombo roads, and even this number will be largely augmented when the harbour is better able to receive them. I make the area of the smallest harbour, when dredged to 26 feet, about 130 acres; Madras having an area of 124 acres, and this, now that the breakwater is nearly completed, looks ridiculously small, so small that a great number of the steamers prefer remaining outside, while none of the sailing ships up to the present time have gone into the harbour.

The harbour would be much better sheltered by Colonel Fyers' plan in both monsoons, but especially from the effect of the N.N.W. swell, which sometimes makes a great commotion, and would be a better entrance for long steamers as they would not have to turn so quickly after entering the harbour.

I do not think the short northern arm I propose as a protection against silting would cost as much as the dredging out the small harbour, and afterwards keeping it the required depth.

By adopting the design recommended by Colonel Fyers and yourself, and adding the short northern arm, you have nearly the area of the largest harbour, with very little more expense than the smallest one would come to.

I am, &c.,

T. COULTER KERR,
Commander.

COLOMBO HARBOUR WORKS.

NAUTICAL OPINIONS.

18.

S. S. "Chinsura,"
Bombay, 13th January, 1881.

SIR,—I HAVE the honor to acknowledge receipt of copy shewing three designs of Harbour works.

Colonel Fyers' proposed simple breakwater will, I think, commend itself to the practical seaman as all that is required for the port. It will give more than sufficient shelter in both monsoons, with a wide and deep entrance. This last is a very important consideration.

I understand fixed moorings are to be laid down sufficient in number to accommodate the large vessels visiting the port. With these moorings nothing further is required.

The two close harbours would be a mistake, as if either be adopted I can predict many accidents to shipping making in or out of them. A sailing vessel running in in N.E. monsoon would not be under command, and would require an empty harbour to manœuvre in, or run into some other vessel if there were many inside.

In the S.W. monsoon sailing vessels, or steamers, would have to make through the entrance at speed. The sea then running would make this necessary. It appears to be a belief that a heavy steamer can be restrained at once by turning engines full speed astern; I would not like to guarantee safety to another vessel inside, if my steamer fully laden had to pass through the narrow entrance in the close harbour plans in a heavy S.W. monsoon sea.

I have had 17 years' experience on Indian Coast with very frequent visits to Colombo in both monsoons.

Adopting Colonel Fyers' plan would not prevent a close harbour being made afterwards, if increased shipping to the port made this necessary. I write knowing the larger steam companies are to use the port.

Much valuable time has been lost in not having the sheltered water inside the breakwater deepened. I have watched with interest when Merak No. 3 was to get to work, and on my last visit to your port that she was likely to do something soon.

I have heard complaints in Colombo that the money spent has been of no use to the mercantile community, owing to want of shelter in S.W. monsoon. The native small coasting trader reaps all the benefit, as no dredger was at work to deepen out sheltered water for larger vessels.

I trust dredging operations will be conducted with energy now to give larger vessels a chance of sheltered water in the next S.W. monsoon.

I am, &c.,
J. R. GAVIN,
Commander.

19.

S. S. "Booldana,"
Colombo, 28th January, 1881.

SIR,—I AM sorry I could not reply to your official letter before on account of illness. However I do so now. I consider Colonel Fyers' single wall, extended some distance further with curve to the N.E. towards Mutwal Point, will be all that is necessary. It will give a large area and ample shelter to shipping throughout the year.

I have consulted a friend of mine (R. C Carrington, Esq., F.R.A.S., of the Marine Survey Department in Calcutta) on the subject, and he also thinks with me that Colonel Fyers' plan extended will be quite sufficient.

I am, &c.,
C. N. WOOD,
Commander.

20.

B. I. S. N. Co.'s S. S. "Rajpootana,"
4th January, 1881.

DEAR CAPTAIN DONNAN,—I have much pleasure in returning you herewith the chart of Colombo Harbour shewing the three schemes for the breakwater. I of course am much in favour of the single breakwater as proposed by yourself and Colonel Fyers, both as to its suitability and simplicity, and I am sure this will be the opinion of all nautical men who have had any experience of this port; and I sincerely hope you will be able to carry through your plan. At my leisure, after leaving this to-day, I intend sending you an official in reply to yours, which I will send you from Tuticorin.*

Yours, &c.,
A. W. MANN,
Commander.

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* Official referred to not yet received.—*J. D.*

X.

VILLAGE TRIBUNALS.

A STATEMENT

SHEWING

THE DISTRICTS, PRESIDENTS, THEIR SALARIES AND STAFFS, AND THE NUMBER AND THE NATURE OF THE CASES DISPOSED OF DURING THE YEAR.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

RETURN shewing the Names of Districts, Presidents, &c., and the Number of Cases instituted, decided, and in Appeal, under "The Village Communities Ordinance," throughout the Island, for the year 1880.

Districts.	Presidents.	Salaries.	Staff.	Cost of Staff per annum.	Institutions: Civil.	Institutions: Criminal.	Institutions: Amicable Settlements under section 23.	Decisions: Breaches of V. C. Rules.	Decisions: Irrigation.	Decisions: Civil: Money.	Decisions: Civil: Land.	Decisions: By Consent.	Decisions: Criminal: Assault.	Decisions: Criminal: Theft.	Decisions: Criminal: Malicious Injury	Decisions: Criminal: Cattle Trespass.	Decisions: Criminal: Maintenance.	Decisions: Criminal: Miscellaneous.	Appeals: To Government Agent: Confirmed.	Appeals: To Government Agent: Set aside.	Appeals: From G. A. to Governor and Ex. Council: Confirmed.	Appeals: From G. A. to Governor and Ex. Council: Set aside.
Western Province.																						
Alutkúru-koralé South.				Rs.																		
Gampaha ...	J. M. P. Pieris, Mudaliyár	Rs. 1,800 per annum including travelling allowance.	4 Native Writers at Rs. 20 each, 4 Messengers at Rs 10 each, 3 Sweepers at Rs. 5 each, and 1 Sweeper at Rs. 3 per month.	1,656	313	237	79	63	9	311	2	3	77	57	29	...	2	...	8	5	...	...
Kanuwana ..					352	215	19	82	1	373	6	1	91	72	4	7	1	...	9	1	3	...
Ambatalenpahala ...					97	173	47	47	...	78	...	1	41	28	20	..	1	...	10	2	1	1
Wattala ...					108	93	23	18	...	87	...	...	34	21	6	...	...	...	3	...	...	...
Héwágam-kóralé.																						
Hanwella ...	J. L. Dassanayaka	Rs. 1,600 including travelling expenses.	3 Native Writers at Rs. 20 each, 2 Messengers at Rs. 10 each, and 3 Sweepers at Rs. 5 each per month.	1,140	264	277	64	103	2	238	13	...	96	70	1	20	5	...	16	1	...	...
Nawagomuwa ...					164	355	126	211	4	128	14	...	81	71	2	34	2	...	6	...	...	...
Mulleriyáwa ...					54	116	15	42	...	42	4	1	29	54	...	11	...	...	4	...	...	...
Salpiti-koralé.																						
Gangodawila ...	D. A A. Wijayasinha, Mudaliyar.	Rs. 1,000, and Rs. 500 travelling allowance.	1 Native Writer at Rs. 20 and 1 Messenger at Rs. 10 per month.	360	550	926	80	100	6	517	14	163	318	230	16	101	9	1	18	3	2	...
Adikári and Méda-pattus of the Siyané-kóralé.																						
Henaratgoda ...	D A E. Dias Bandaranayaka	Rs. 1,600 including travelling allowance	2 Native Writers at Rs. 20 each, 2 Messengers at Rs 10 each, and 1 Sweeper at Rs 5 per month.	780	688	602	293	112	5	525	5	...	164	141	5	...	8	...		2	...	...
Mahara ...					438	525	227	130	...	367	1	...	135	70	3	...	3	...		1	1	...
Negombo.																						
Dunagaha ...	Adrian De Silva ..	Rs 1,200 and Rs. 300 travelling allowance	1 Native Writer at Rs. 20, 1 Messenger at Rs. 10, and 1 Sweeper at Rs 5 per month	420	276	138	44	44	...	250	...	...	22	39	3	17	2	3	6			
Minuwangoda ...					708	453	152	9[illegible]	...	613	...	...	104	131	6	37	5	10	6	3	1	...
Kégalla.																				5	5	..
Máwanella ...	L. B. Kobbekaduwe ..	Rs 1,000 and Rs 500 travelling allowance	4 Native Writers at Rs. 20 each, 4 Messengers at Rs 10 each, and 5 Sweepers at Rs — each per month	1,710	1000	796	205	268	24	712	56	...	200	138	88	148	36	...	9			
Rambukkana ...					683	654	155	167	27	513	36	...	69	110	61	90	12	...	29	1	...	...
Dehiówita ...	J. C. Molamura ..	Do.	—	—	672	450	195	106	63	407	87	...	92	82	17	66	7	.	40	2	...	...
Ruanwella ...					248	148	45	56	5	169	51	..	28	15	7	15	5	...	20	2	...	...
Bulatkohopitiya ...					414	397	151	118	4	306	20	1	66	86	5	52	2	...	7	2	...	...
																			1	2	...	...
																			3	...	...	...

Ratnapura.				Rs.																		
Higgashéna ...	E. F. Mapitigama ...	Rs 1,000 and Rs. 500 travelling allowance.	1 Native Writer at Rs. 20, and 1 Messenger at Rs. 10 per month.	360	467	365	103	184	4	465	2	54	33	85	7	48	4	...	17	4	1	...
Minnana ...					293	139	76	67	1	290	3	13	9	27	8	24	3	...	5	1	...	...
Kiriella ...					179	84	34	42	1	177	2	8	7	6	1	25	2	...	6	1	...	...
North-Western Province.		Rs.																				
Wé-udawilli-hatpattu ...	J. C. Amarasekara ...	800*	1 Clerk, 2 Messengers and 1 Court keeper	510	1983	2057	1540	243	2	1854	24	..	146	143	5	1510	30	...	57	35	2	...
Wanni-hatpattu ...	C. H. Moonamale ..	800*		510	1854	1311	801	667	1	343	91	622	96	75	30	434	31	...	29	14	...	...
Dewamédi-hatpattu ...	S. E. Herat .	800*		510	2852	1201	510	204	...	3035	75	..	175	315	47	368	56	...	67	29	1	...
Katugampola-hatpattu ...	R. B W. Moonamale ...	800*		510	3361	1686	10464	154	3	2418	20	...	173	215	23	786	40	...	35	25	1	1
Hiriyala-hatpattu ...	Dodanwela Banda ..	800*		510	1717	1208	105	233	...	1486	102	413	78	76	4	695	31	...	38	13	...	...
Demala-hatpattu ...	R. A. H. Banda ...	800*		596	478	215	44	76	...	478	3	91	30	19	1	81	4	...	4	1	...	...
Southern Province.																						
Galle.																						
Bentota Walallawiti-kóralé	Andrian de Silva and A. W. M. Werasinha	Rs. 1,100 and Rs. 360 travelling allowance	1 Clerk and 2 Peons ...	Clerk 240 Peons 180	1030	653	555	163	...	1380	4	...	174	250	20	55	10	...	75	23	2	3
Hinidum-pattu and Mapalagam	C. A. Senewiratna and A. R. Senewiratna	Rs. 840 & Rs. 1,000, and Rs. 360 & Rs. 360 travelling allowance	do. do. ...	Clerk 360 Peons 240	447	206	136	57	...	427	9	2	58	81	10	21	3	...	32	9	2	2
Mátara.																						
Weligam-kóralé ...	D. A. Tillakeratna and R. A. Dunuwila	Rs. 1,100 and Rs 360 travelling allowance	do. do. ...	Clerk 240 Peons 180	928	773	362	121	...	928	..	34	398	225	5	...	24	...	36	7	1	...
Wellaboda-pattu ..	J. D. C. Perera and C. A. Senewiratna	Rs. 500 & Rs. 420 and Rs 180 & Rs. 150 travelling allowance	do. do. ..	Clerk 240 Peons 180	1061	959	374	227	34	789	141	...	198	189	32	28	23	...	136	15	4	2
Gangaboda-pattu ...	J. F Tillakeratna and T. B. Karunaratna	Rs. 550 & Rs. 420. and Rs 180 & Rs 150 travelling allowance	do. do ...	Clerk 240 Peons 180	1169	926	244	191	...	1031	22	13	301	160	4	6	22	...	52	7	1	...
Morowak-korale ...	A. R. Senewiratne and J. D. C. Perera	Rs. 420 & Rs. 550 and Rs. 150 & Rs. 180 travelling allowance	do. do. ...	Clerk 240 Peons 180	543	262	148	93	18	459	36	2	94	83	7	3	6	...	17	3	...	...
Eastern Province.		Rs																				
Batticaloa North ...	J. Somanada, Mudaliyar ..	1,200	... 4 Clerks and 5 Messengers	1,050	2762	923	1114	216	1	2559	6	499	125	192	15	81	184	..	4	2	...	...
Batticaloa South ...	Ebenezer Crowther ...	1,200	... 4 Clerks and 4 Messengers	1,080	3285	669	1017	224	...	4001	...	590	90	118	13	7	55	...	24	...	...	...
Trincomalee ...	M. Nannamuttu ..	1,000	... 3 Clerks and 2 Messengers	720	...	...	...	...			...		...	...	...	...	...	...	...	..	...	...
Koddiar-pattu ...					585	148	70	33	...	549	...	20	71	18	11	...	3	...	3	1	...	...
Kaddukkulam-pattu ...					493	237	144	78	...	381	10	47	52	25	9	6	8	...	3	1	...	...
Tampalakam-pattu ...					360	157	78	94	...	316	...	22	33	11	10	...	2	...	...	...	...	...
Central Province.																						
Kandy.																						
Udunuwara ...	Kuda Banda Kobbekaduwa	1,320 ..	2 Clerks and 2 Peons ..	810	649	953	59	205	51	322	257	60	69	157	59	45	48	...	4	1	1	..
Uda Dumbara ...	C B. Nugawela ...	1,698 ..	2 Clerks and 3 Peons ..	930	1161	947	175	433	51	1191	21	112	220	109	96	61	53	..	37	9	..	...
Páta Dumbara ..					559	336	29	167	7	555	1	33	56	33	25	45	18	...	1	2	...	...
Badulla.																						
Udukinda ..	H. E. Dambawinna ...	Rs. 1,219 and 92 cents	1 Clerk and 2 Messengers...	540	341	261	135	96	5	269	7	18	19	7	26	26	9	...	3	...	...	...

* The Presidents also draw a sum of 360 rupees as Travelling Allowances.

Districts.	Presidents.	Salaries.	Staff.	Cost of Staff per annum.	Institutions. Civil.	Institutions. Criminal.	Amicable Settlements under section 24.	Decisions. Breaches of V. C. Rules.	Decisions. Irrigation.	Decisions. Civil. Money.	Decisions. Civil. Land.	Decisions. By Consent	Decisions. Criminal. Assault.	Decisions. Criminal. Theft.	Decisions. Criminal. Malicious Injury.	Decisions. Criminal. Cattle Trespass.	Decisions. Criminal. Maintenance.	Decisions. Criminal. Miscellaneous.	Appeals. To Government Agent. Confirmed.	Appeals. To Government Agent. Set aside.	Appeals. From G. A. to Governor and Ex. Council. Confirmed.	Appeals. From G. A. to Governor and Ex. Council. Set aside.
Central Province.—*contd*																						
Mátalé.		Rs.		Rs.																		
Mátalé North ...	W. A. Dullewe ...	1,200 ..	1 Clerk and 2 Peons ...	540	1201	653	430	288	6	1115	94	22	213	133	37	...	18	...	30	6	...	...
Mátalé East ...	Senewiratna Ratwatte ...	1,200 ...	do. do. ...	540	1238	524	178	...	...	1021	6	145	366	57	...	11	18	...	20	6	...	...
Nuwara Eliya.																						
Ulapane ... / Uḍa Héwaheṭa ...	T. B. Madugalla ...	1,320 ...	2 Clerks and 2 Peons ...	780	327	518	179	158	1	292	10	...	40	81	18	179	25	...	2	1	...	...
Kotmalé ...	W. T. Banda ...	1,320 ..	do do. ...	780	750	658	199	217	...	722	3	...	117	120	30	130	14	..	10	6	...	...
	Gansabhawe Clerk attached to the Kandy Kachcheri.	360 ...	1 Clerk and 2 Peons ...	715	273	347	104	155	7	253	2	...	89	62	25	18	9	...	2	...	..	...
North-Central Province					...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...
Western Division ...	Relapanawewe Disanayaka Mudiyanselage Punchirala	1,200 ..	1 Native Writer and 2 Messengers ...	360	824	530	212	271	16	801	22	1	120	17	1	102	19	...	10	10	...	...
Eastern Division ...	Demunuwewe Disanayaka Herat Mudiyanselage Ukkubanda ...	1,500 .	do. do. ...	360	500	445	82	257	16	487	13	274	32	8	3	123	22	...	31	7	...	...
Southern Division ...	Semasinha Nawaratne Wasala Mudiyanselage Timbiriwewe Tikiri Banda..	1,200 ..	do. do. ..	360	571	329	258	149	37	216	18	337	49	19	3	97	12	...	13	..	...	1
Tamankaduwa ...	B. H. Emam* ... / E. M. de Costa† ...	780 ...	1 Clerk and 1 Messenger.	270	184	55	43	21	...	75	...	37	7	2	15	...	...	...	...	..	...	..

* 1st January to 20th August, 1880. } Receives as Ratemahatmaya of Tamankaduwa 720 rupees per annum.
† 21st August to 31st December „ }

XI.

REPORT

ON

THE PEARL FISHERY OF 1881.

By W. C. TWYNAM, Esq.,
GOVERNMENT AGENT, NORTHERN PROVINCE.

Ordered by His Excellency the Lieutenant-Governor to be Printed.

COLOMBO:
GEORGE J. A SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

REPORT ON THE PEARL FISHERY OF 1881.

From the GOVERNMENT AGENT, Northern Province, to the HON. the COLONIAL SECRETARY.

Silávatturai, 9th May, 1881.

SIR,—I HAVE the honor to forward for the information of Government—copy of the Diary kept by me during the recent fishery, and copies of the following returns and statements :—

1st. A statement of oysters fished (A.)
2nd. Customs returns of imports, &c. (B.)
3rd. Statement of all kinds of sickness treated in the hospitals (C.)
4th. Statement of salt and arrack sold during the fishery (D.)
5th. Account particulars of oysters sold (E.)
6th. Return of diving boats and divers (Fr 2.)
7th and 8th. Statements of valuation of samples (G & H.)
9th. Statement of oysters exported to Colombo, &c. (I.)
10th. Average rates at which pearls were purchased by traders at different stages of the fishery (J.)

The bank fished was the North-west Cheval-Paar, in length about 2½ miles, in breadth about one mile, and in estimated area 8,600,735 square yards.

According to the publication made in December of the inspection of November, the bank was estimated to afford fishing for 100 boats for thirty days, bringing loads of 10,000 each, giving a total yield of 30,000,000.

The sample taken up in November was valued at Rs. 21·37 per 1,000 ; that of February at Rs. 21·81 per 1,000. (See statements annexed, G. & H.)

The estimated Government share (two-thirds)—viz., 20,000,000—if sold at Rs. 21·37 per 1,000 would have realized Rs. 427,400 ; if sold at Rs. 21·81, Rs. 436,200 ; if at the mean of the two valuations, viz , Rs. 21·59, Rs. 431,800 ; and if at the average rate during the fishery, viz., Rs. 32·58, Rs. 657,000.

Taking the Government share of 30,000,000 at three-quarters as in previous years, instead of two-thirds—viz., 22,500,000—the proceeds on that quantity at the average rate during the fishery would have been Rs. 739,125.

The actual yield of the Fishery has, however, been as follows :—

Number of days fishing by account ...	47
Actual number of days fishing in reference to number of boats that reached the bank daily and advertised number ...	44¼
Total number of boats...	4,422
Total number of oysters fished	27,338,596
Government share	18,225,731
Proceeds at rupees 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50, 52, 53, 54, 55, 56, 57, 58, 59, 60 and 62 ...	Rs. 598,688
Average price per thousand	,, 32·85

Note.—The actual yield of the Fishery is as follows :—

Proceeds sale of oysters ...	Rs. 598,688
Sale of sample pearls of November and February	745
Sweepings of the kottu ...	100
Total—Rs.	599,533

If the oysters had sold at the value of the sample of November—(Rs. 21·37)—the amount realized would have been ... Rs. 389,484

Do.	do.	February ...	21·81	,, 397,503
Do.	do.	Mean of both ...	21·59	,, 393,494

If the Government share had been three-quarters as in previous years, instead of two-thirds, the amount which would have been realized at the average of Rs. 32·85 would have been Rs. 673,555 on 20,503,947 oysters.

The divers' share of the oysters fished—viz., 9,112,865—is estimated to have sold at Rs. 299,076, at an average of Rs. 3,282 the thousand.

Of the oysters bought in, 26,395,096 are supposed to have been washed in Silávatturai, and 943,500 exported to Colombo and other places. (See statement annexed.—I.)

Fishing was advertised to commence on the first favorable day after the 20th February. By the 22nd, however, only 17 boats and about 40 divers had arrived, and by the 27th only 66 boats and 214 divers. On the 28th, 52 boats, chiefly from Kilakarai,

PEARL FISHERY, 1881.

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arrived with about 300 divers, and preparations were made to commence fishing, with the boats and divers that had arrived, immediately the weather became favorable.

Up to the 3rd March the wind blew strong from the land. On the afternoon of the 3rd the sea-breeze set in, and fishing was commenced on the 4th with 91 boats and about 900 divers.

Diving boats from various ports came dropping in with divers up to the 10th March, when there were 216 boats with at least 1,000 divers in the place. Of these boats, 213 were employed on the fishery in two divisions (red and blue). Three boats could not get divers. (See statement annexed.—F.)

There were divers enough to afford the full complement of ten divers for I believe 100 boats, a few having worked during the fishery with only four, six, and eight. At no fishery since that of 1837 (concerning which I have no record) have so many divers come. There were, as I have remarked, fully 1,000, whereas at no fishery since that of 1837 have there been more than sufficient to man 75 boats. By an account taken on the night of the 7th March there were in the 98 boats that went out that night 950 divers, enough to afford the full complement of 10 men for 94 boats; some more arrived on the 10th, when there were enough for 103 boats. On the last day of fishing (27th April) an account taken on the bank shewed that there were 660 divers in the 83 boats, giving an average of about eight to each boat.

During the last ten days of the fishery, after the breaking up of the red and blue divisions, some of the boats worked with twelve and fifteen divers, others with only three, four, five, six, seven and eight. Between the 17th and 27th April about 200 divers left the place, and some did not care to go out. I believe 900 would be about the average number that worked daily during the fishery.

There is no doubt that the increase of the share given to these men, from one-fourth to one-third, had a great effect in bringing them in greater number to the fishery. With comparatively good prices, and on the whole tolerably fair loads, the divers have this year received something like fair remuneration for the hard work they have had to go through; whilst at the same time, in consequence of the fine weather experienced during the fishery, which prevented any stoppage of fishing, they have been enabled to take away almost all their earnings, and they have all left Silávatturai quite contented. The boatmen, divers, &c., have this year made amongst them fully half the amount received by Government.

The following is a calculation I have had made of the probable average earning of each boat-owner, &c., &c.:—

			Rs.		Rs.
213	Boats at an	average of	220·77	each	47,025
213	Tindals	do.	26·49	,,	5,642
213	Samaties	do.	26·49	,,	5,642
213	Thodai	do.	26·49	,,	5 642
*1000	Divers	do.	156·75	,,	156,750
1000	Manducks	do.	78·37½	,,	78·375
			Total Rs.		299,076

Although some days later than the advertised day, fishing commenced this year earlier than in any previous fishery since that of 1837. The weather was in many respects like that experienced during the fishery of 1877, and was in every way favorable for fishing, which was carried on almost without interruption, except on Sundays, till the 27th April. Only once (on the 18th March) were the boats so late in reaching the shore, owing to land squalls, as to render it impossible for the divers to get ready to go out in the other division of boats for the next day's fishing; and only on two days (on the 11th and 26th April) were any large proportion of the boats which started on the previous night unable to reach the bank owing to the southerly wind meeting them before reaching the inspection vessel. But even on these days many more of the boats might have reached the bank, if they had started in proper time and when ordered to start.

There were nominally 47 days' fishing, but only 44¼, in reference to the number of boats which reached the bank and fished during the fishery, and the daily advertised number. Some trouble was experienced in getting the divers out after the expiry of the advertised number of days (30). I believe this was owing, however, to the divers not having entered into fresh agreements with the boat-owners; and to the Roman Catholic Easter holidays and Tamil New Year falling in the same week. There is no doubt that some of the Roman Catholic divers and traders wished to return home for the Easter holidays; and that all classes wanted to make "holiday" of it during the week, but with some persuasion the divers were induced to go out during the week; the Roman Catholic divers refusing to go out only on Good Friday.

The almost uninterrupted fishing, with only the Sunday's rest, began however to tell on the divers towards the close of the fishery; and it was with some difficulty they were

* Some of the most expert divers and those who chose to work regularly and hard have, however, made from between 300 to 500 rupees each.

induced to go out during the last few days. It was stated to me that some of them were complaining of severe pain in the chest brought on by continuous diving, and as the bank began to shew signs of being fished out, and they experienced in consequence some difficulty in getting fair loads, many, as before remarked, did not care to go out.

The attendance of merchants, pearl dealers, and traders from all parts of India and Ceylon, attracted by the reports of a large and profitable fishery, was also much larger than at any previous fishery since that of 1837. Besides the wealthy Mohammedan merchants, Natucotta, and Comaty Chetties, and Brahmins from Madras, Calcutta and Bombay, there was a large number of small speculators, principally Moors from Kilakarai and other places in Southern India; and Nadans and Chetties from the neighbourhood of Ramnad, whose presence rendered attempts at combination to bring down prices unsuccessful, though such attempts were made two or three times, and in one particular instance in the middle of the fishery, when efforts were made to force the divers to sell at low rates, in the hope of bringing down the price in the sale bungalow next day. This attempt failed owing to the stand the divers were enabled to take in consequence of what they had earned in the early days of the fishery. There was in general brisk competition for the oysters at the sales; a large proportion having been purchased by the small speculators referred to.

During the inspection of the bank in February, Captain Donnan found that fully 40 per cent. of the oysters had died off since the inspection of November, and the result of the first few days' fishing was sufficient to show that the oysters had attained maturity (were "fully ripe," as the people expressed it) and were fast dying off; the loads brought in having been much below the estimated quantity, and a large proportion of dead shells having been brought up by the divers. The oysters, over two-thirds of the bank, were pronounced good and rich in pearls; and except that they were much scattered over the bank and mixed with dead shells, the divers experienced no difficulty in fishing them. On the north, however, the oysters were smaller and covered with a growth of coral, which seriously interfered with the operations of the divers, who complained much of their hands being cut by the coral.

On these oysters of the northern patch the merchants and petty traders declared they had lost money, as they did not yield pearl in the same proportion as those on the southern part of the bank. The heavy loads were, however, chiefly fished from the northern patch. The oysters were all of the same brood and the same age as those on the south; and it is possible that the coral, with which almost every oyster fished from the northern patch was covered, had prevented their proper development.

The proportion of dead shells was the same on the north as on the south, and I believe that Government has just escaped a loss of revenue similar to that experienced in 1864, when the oysters, which it was anticipated on November, 1863, would afford a very fine fishery in 1864, died off or were destroyed before March, 1864.

On the whole, the fishery has been, from all I have been able to gather, a remunerative one to all concerned. There was a great demand for pearls throughout the fishery, and the small speculators always found a ready market for their pearls. The loss said to have been sustained on the oysters of the northern patch was no doubt made up by the good yield of the oysters of the southern patch and the high prices obtained for the pearls. There is the fact that the price at the sale bungalow only once went down to the value of the samples (viz., on the first day of sale) that there was also brisk competition for the oysters; and that the price gradually rose, which would not have been the case if the speculators were losing on their purchases.

The samples I may remark were both indifferent, and did not fairly represent the quality of the oysters on the bank.

During the inspection of November Captain Donnan estimated the number of oysters on the bank at 50,000,000, and, as before remarked, after the inspection of November, fully 40 per cent. had died. This has not, however, in my opinion, caused any loss of revenue to Government. On the contrary, I am inclined to believe that if the quantity originally on the bank (50,000,000) had been fished (as they would undoubtedly have been if they had lived, with the beautiful weather experienced during the fishery and the large number of divers at work), Government would not have realized what has been realized, as the rate per thousand would have gone lower than the sample value.

50,000,000 oysters would have given Government share 33,333,333, which, at 20 rupees the 1,000, would have yielded 666,667 rupees. The rate would, however, I believe, have gone down to 15 rupees. Efforts were made several times during the fishery, as it was, to bring the price down to 15 rupees the 1,000.

With 50,000,000 oysters on the bank, and daily hauls of from one and a half millions to two millions for from twenty-five to thirty days, the competition of the small traders would not have kept up prices. Half the number of oysters bought in would have been sufficient for them; and the rich traders would very soon have had it all their own way in the sale bungalow, whilst the divers would have been forced to reduce their rates.

33,333,333 oysters at 15 rupees the 1,000 would only have yielded 500,000 rupees.

In fact, I believe that Government would not have sustained any loss of revenue if the oysters had died down to 18,000,000, as the selling rate would no doubt have ultimately

PEARL FISHERY, 1881.

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averaged 50 rupees the 1,000, and that the Government share of 12,000,000 would have sold for at least 600,000 rupees. A reference to the sale statement will shew that up to the thirteenth day of fishing, the average rate was only 26 rupees and 93 cents the 1,000, for 6,932,202 oysters; and it was only when the merchants and traders began to realize that the oysters were dying off, and that the loads were not being purposely kept low in order to keep up prices, and to find after the washing of the oysters of the first few days' fishing that the oysters were much superior to those of the sample, that the rate per 1,000 went up; the average of the selling rate from the thirteenth day having amounted to 36 rupees and 48 cents.

At the average of the first thirteen days (namely, 26 rupees 93 cents) the total Government share (18,225,731 oysters) would only have realized 490,819 rupees. After the first few days of the fishery it seemed very doubtful indeed if even 300,000 rupees would be realized.

The health of the place has been remarkably good throughout the fishery, there having been no cases of epidemic disease.*

The bazaar was always well supplied with all articles of native diet, and there was an abundant supply of water in tanks and wells for bathing, cooking, and drinking.

The assemblage of people commenced earlier this year than at former fisheries, and the town was tolerably full early in March. By the close of March, I believe there must have been from 10,000 to 12,000 in the place, viz.:—Officials and their servants, 500; boatmen, divers, manducks, and their families and attendants, 4,000 to 5,000; merchants, pearl-dealers, traders, boutique-keepers, coolies, &c., 6,000 to 7,000.

Cleanliness was strictly enforced, and sanitary measures carried out, as before, by a strong body of scavengers under the supervision of Medical Practitioner Naveretnesingam, who was again specially employed for the purpose this year, and a sergeant of Police, also employed in this duty last year. Health inspections of the divers' quarters, bazaar, &c., were made several times daily by the medical officers under the orders of Colonial Surgeon Dr. Margenout.

In anticipation of a more than ordinary gathering during the fishery a larger extent of ground than usual was cleared of jungle, the boundary flags were thrown further back, the private kottu ground was extended and the oyster shells of last fishery removed, the divers' quarters were extended and well-drained, additional streets were opened, and the roads, streets, bridges, and culverts were thoroughly repaired, new culverts built where required, and side-drains and drains deepened and cut so as to thoroughly drain the town and divers' quarters in the event of heavy rain during the fishery.

Three houses of refuge were erected, one at Pulipandjodai and two behind the town.

The cholera and small-pox hospitals and quarantine shed were removed from their old site, almost immediately behind the private kottu, to the site of the old military buildings at Pulipandjodai.

Ten additional wells were sunk and built up with masonry, so that there were in all eighteen wells in the town between Kroosaddi in the north and the private kottus in the south within the boundaries, and three at Pulipandjodai for the hospitals and quarantine shed; and on the suggestion of Captain Donnan in November a dam was thrown across the odai or water-course on the north of the town, so as to form a tank (similar to the old tank near the bazaar), in which a good supply of water was stored up for bathing, whilst the old tank was reserved for the supply of water for drinking and cooking purposes to those who preferred tank to well water. The new tank was highly appreciated by the people, who resorted to it in large numbers day and night for the purpose of bathing.

As very great anxiety on account of fire has always been felt in regard to the treasure and the arms and ammunition of the Police, which have always hitherto been kept in temporary buildings, a masonry vault and a masonry arm-room were built this year in the Pearl Fishery Kachcheri and in the Police Station at small cost, the materials of the old military buildings having been as much as possible made use of in their erection.

All the arrangements in regard to buildings, &c., were carried out under the superintendence of the Adikár of Músali (M. Seemanpillai, Mutaliyár), who deserves very great credit indeed for the zeal, energy, and ability with which he carried out the instructions given to him.

The flying telegraph line has been of much service, and a very great convenience to the merchants and traders. It was in full working order before the commencement of the fishery, and has, I believe, more than repaid the cost of putting it up and working expenses of the office. The cost of putting it up and taking it down will not exceed 1,000 rupees. I have not yet received a statement of the cost of putting up the line and of working expenses, and of the amount realized on account of messages. The line was

* A case of small-pox, seven days old, was discovered in the Inspection vessel early in February, before the commencement of the Fishery. The patient was a Moorman, one of the crew, who must have had the disease on him when the vessel left Colombo.

The crew and Government divers and manducks were placed in quarantine till the commencement of the Fishery.

put up in a very short time by Mr. Simpson, Sub-Assistant Superintendent of Telegraphs, Northern and Eastern Provinces.

Although violent squalls of thunder and lightning and wind passed repeatedly over the place, they were unaccompanied by much rain, and there was comparatively little rain in Silávatturai during the fishery; there having been no heavy downpour such as was experienced in 1877. These squalls no doubt tended much to the healthiness of the place by cooling and clearing the atmosphere, which became at times exceedingly hot and oppressive.

As the supply of oysters decreased, the petty traders began to leave the place. About the 23rd April some of the divers also went away by land. Some tried to go by sea, but were prevented. Some of the principal Chetties left on the 26th April, and by the 30th April almost all had cleared off, except a few pearl-traders and those who had purchased the last two or three days' oysters. The divers and boats had all gone by the morning of the 1st May.

The people assembled at the fishery were exceedingly orderly and well-behaved. No crime of a serious nature occurred during the fishery. There were a few cases of petty theft of oysters and pearls and one or two of common assault.

All the subordinate officers selected for duty during the fishery have worked zealously and well. The Police Force, under Inspector Trevena (who also held the appointment of kottú superintendent) have, with one or two exceptions amongst the native constables, behaved very well indeed, and have rendered willing and efficient services in all matters connected with the fishery.

In conclusion, I would beg to submit for the consideration of Government the desirability of establishing a chank fishery in the neighbourhood of the pearl banks off Silávatturai between Mannár and Kudrimalai, on the principle on which, as I am informed, the chank fishery is now conducted, with much advantage to all concerned, at Tuticorin.

The chank fisheries are no doubt the training grounds of the divers employed on the pearl fisheries, and if a chank fishery were established at Silávatturai, it would very probably have the effect of inducing some of the Indian divers to settle in the neighbourhood, and lead to the training of a body of Ceylon divers whose services would be available at a pearl fishery, whilst the profits on the sale of the chanks would go far towards paying the expenses incurred on account of inspecting and guarding the banks.

Of the 1,000 divers employed during the late fishery, I do not believe fifty belonged to Ceylon; and even for inspection work we are dependent on Indian divers.

There is a small colony of Moorish divers at Erkelempetty in Mannár, employed in the chank fishery, who come to the pearl fisheries; but besides these men I am not aware of any Ceylon divers being employed at the fisheries.

There used to be a small body of Ceylon divers in Arippu before 1855, but they have disappeared† except one very old man. The divers on the chank fishery off The Islands near Jaffna are chiefly, if not all, Indian divers.

Tuticorin and Kilakarai supply almost all the divers engaged in the Ceylon pearl fisheries. The former are chiefly Paravas, and certainly proved themselves excellent divers during the late fishery; the latter are Moors. A small number of Tamil divers come from ports north of Paumben.

Chanks can be fished all along the west coast of the Northern Province, from Analativa to Kudrimalai, but fishing is at present allowed only north of Mannar Island, in order to prevent poaching on the pearl banks.

A very profitable chank fishery might, I believe, be established south of Mannár. Of course such a fishery could not be allowed in the neighbourhood of the pearl banks, unless a guard vessel were placed on the banks with a trustworthy officer in command, whose duty it should be to supervise the chank fishery and protect the pearl banks.

I have talked the matter over with Captain Donnan, who agrees with me in the opinion that a chank fishery might with advantage be established at Silávatturai. We think the matter is one that deserves the consideration of Government, as we believe that every effort should be made to keep up and increase the diving class, and if possible to train up a local body of divers; the difficulty experienced in fishing the banks during recent fisheries having arisen, in a great measure, from want of a sufficient number of divers.

I am, &c.,

W. C. TWYNAM,
Government Agent.

P.S.—Since writing the above I have received a letter from Mr. Simpson, copy of which I annex, regarding the cost of the telegraph line.—W. C. T.

NOTE.—I concur in Mr. Twynam's remarks upon the desirability of establishing a chank fishery between Kudrimalai and Mannár.

J. DONNAN,
Inspector.

† This old man was working in the Pearl Fishery of 1814 as a diver in the privilege boat of the Adepenar

PEARL FISHERY 1881.

LETTER from Assistant Superintendent of Telegraphs to the Government Agent, Northern Province.

Letter alluded to in Postscript.

From the ASSISTANT SUPERINTENDENT of Telegraphs to W. C. TWYNAM, Esq., Government Agent, Northern Province.

No. 45.

Trincomalee, 3rd May, 1881.

SIR,—I HAVE the honor to acknowledge the receipt of your letter of the 29th ultimo, and to inform you that I have forwarded it on to the Postmaster-General for permission to dismantle the flying line of Telegraph from Mannár to Silávatturai.

The cost of constructing the line, exclusive of the salaries and allowances of the permanent establishment and value of the wire and tools employed in the work, which were not chargeable to the work, was Rs. 602·97, as follows :—

			Rs.	Cts.
Materials purchased	...	...	402	7
Carriage of stores	...	...	94	50
Miscellaneous charges	...	..	44	72
Labour	...	...	161	68

The probable cost of dismantling the line will be Rs. 305, as follows :—

			Rs.	Cts.
Carriage of stores	...	...	205	0
Miscellaneous charges	...	...	25	0
Labour	...	...	75	0

against which may be set off, value of stores recovered from the line, viz., 220 palmirah supports at 50 cents each = Rs 110 ; so that the probable actual cost on this account will be Rs. 195.

I regret I am not in a position to give you the cost of working the office, the amount realized by telegrams and portion due to Ceylon Government ; but I have requested the Postmaster-General to afford you the information from the accounts and returns submitted by the Pearl Fishery Post and Telegraph office to his office.

I have, &c.,
G. SIMPSON,
Assistant Superintendent.

DIARY.

DIARY KEPT DURING THE PEARL FISHERY OF 1881.

SILÁVATTURAI.

February 28th, 1881.

LEFT Jaffna at midnight of the 26th, and reached this yesterday (Sunday 27th) at 7 P.M., having come by ballam to Mannár, where I stopped for a short time, and by steam launch from Mannár to this. The Jaffna police, consisting of two sergeants and twelve men and four constables, who are to be employed as counters, arrived this morning.

Found the *Geraldine* with Captain Donnan on board at anchor. Went on board and took up my quarters in the vessel until the fishing commences. Landed at noon to-day with Captain Donnan. Inspected buildings, koṭṭus, and part of the bazaars.

The Colombo police, in charge of Inspector Trevena, arrived on the 21st. Inspected the force and informed Inspector Trevena that he would have the appointment of superintendent of the Government koṭṭus, and directed him to make arrangements to commence work in the koṭṭu without delay.

After inspection of the police, selected sergeants and constables for the guards and for other special services during the fishery, and gave the following instructions :—

A guard of six men and a sergeant, furnishing two sentries, will be placed this year over the Government koṭṭus in addition to the watch of the counters. The beat of each sentry will be two sides of the koṭṭu—of one east and south sides, of the other west and north sides, within the outer fence. The koṭṭus will have an outer and inner fence. The gates of the inner fence will be padlocked when work has closed for the day, the keys being kept by the superintendent. The gates of the outer fence will also be closed immediately work is over, and the sergeant of the guard will take care that no one but the guard is ever admitted within the outer fence except during working hours, when people having business at the koṭṭus are only to be allowed to go in and out of the koṭṭus. No one is on any account to be allowed to wander about between the fences, and no one is to be allowed to loiter about the koṭṭus during the night. The guards will be supplied with conveniences within the outer fence, and they are not to wander about outside the outer fence, the gates of which are to be always kept fastened when work is not going on in the koṭṭus. Two guardrooms will be erected, one on the land and the other on the sea side of the koṭṭu, within the outer fence The sergeants of the guards will move the guards from one to the other, according to the state of the wind, so that the men may be as little as possible exposed to the atmosphere of the koṭṭu in the event of its being found necessary to keep oysters in it for any length of time, as in 1879 and 1880. The sentries will patrol round the koṭṭús within the outer fence during the day with side-arms, and during the night with rifles with swords fixed, and they will see that the counters' watch is on the alert. The watch of counters will patrol round the koṭṭu also within the

outer fence, two counters on each side with lanterns. The counters will be divided into three watches as in last year. The two pass receivers' peons and one counter (the Adappan of Mannár) will act as head watchers.

A guard of six men and a sergeant will be placed as in 1880 in the Pearl Fishery Kachcheri, which will supply two sentries, one over the Treasury, one over the arm-room, at the station. During the day the sentries will mount guard with rifles; during the night with rifles with swords fixed. Each man on guard will be supplied with ten rounds of ball ammunition. In addition to the beat constables, a patrol consisting of a sergeant and four men will visit all parts of the town and divers' quarters at uncertain hours during the night, and see that the beat constables are on the alert.

Inspector Trevena is requested to warn the sergeants and constables to be vigilant when on duty, as there is a large amount of money in the place just now, but at the same time to impress on them that, whilst affording all the protection in their power to the traders, &c., assembled here, and doing their best to detect crime and to prevent breaches of the peace, they are not to needlessly harrass or molest the people, who are to be left as much as possible to themselves. As regards nuisances, there will be a large body of scavengers, who should be able to keep the town and ground within the boundaries thoroughly clean.

In the event of an alarm at any time of any nature, the off duty men will at once assemble at the station in front of the arm-room ready to act as may be required. The beat constables and the guards will remain at their posts (the sergeants placing the guards under arms) and await orders.

The police must at all times be particularly watchful in regard to fire. Constables on duty are not to allow people to walk about with firebrands and chools, and no one is to be allowed to prowl about during the night in the vicinity of the Government buildings.

Selected a body of scavengers. Sergeant Narayanasamy, who was here last year, is told off for sanitation duty with two constables as in last year.

One constable is told off to attend the lighting of the town. Four boys of the scavenger gang are placed under his orders to attend to the lamps.

Six scavengers are placed immediately under the order of the police to clean, and disinfect daily, all the latrines attached to the houses of the clerks, &c., and to sweep the ground round the Government buildings. The scavengers will be worked in eight divisions as at last fishery, each under a kangani, and the whole under the supervision of Mr. Navaratnasingham, medical practitioner, who superintended the sanitation business last year.

The flying telegraph line between this and Mannár has been completed, and is now in working order.

Returned to the *Geraldine* late in the evening after seeing a large number of the merchants, amongst whom are the Khateeb, agent of Hadjee Mohamadu Badsha Sahib & Co., from Madras, and Adhivirayun Chetty, the head of the commatties from Negapatam.

March 1st, 1881.

Landed in the morning with Captain Donnan. Walked round the bazaars. Gave numbers to the boats here, in all 164. Two divisions of 100 each (if a sufficient number of boats come) red and blue will be worked this year.

The sample was valued in the afternoon. A number of traders came to the bungalow, when the valuation was being made. Valued at 22 rupees the thousand.

Wind for a short time during the afternoon fresh from north and north-west; went round however, and blew fresh from the land during the latter part of the afternoon—unfavourable therefore for the boats returning from the bank; decided on not sending the boats out to night, and returned to *Geraldine* in the evening.

March 2nd, 1881.

Landed again with Captain Donnan in the forenoon. Inspected private kottu ground and completed inspection of bazaar, cooly sheds, wells, tanks, divers' quarters, &c., &c. The new tank on the north of the site of the Government buildings, and between it and Kroosaddy, which I caused to be made on the suggestion of Captain Donnan, is a great success, and will afford a good supply of water for bathing, whilst the old tank in the east will, as hitherto, be reserved for the supply of water for drinking and cooking purposes Ten new wells have been sunk and built up with coral brick and cement, and there are now in all eighteen wells, including the one in the tank within the boundaries.

The hospitals (cholera and small-pox) and the quarantine shed have been removed this year from the old site almost immediately behind the private kottus to the site of the old military buildings at Pulipanjodai. Three wells have been sunk in front of them. As much anxiety was always felt on account of fire in regard to the treasure and the arms and ammunition of the police, the Adikar of Músalai was ordered to erect a vault in the Pearl Fishery treasury, and a strong-room in the police station for the arms and ammunition. These have been completed at comparatively small cost with materials from the old military buildings.

The private kottus cover a much larger extent of ground than in former fisheries, and they are now nearly all fenced and ready

Ordered the Adikar to extend the road to the "Odai" on the south for the convenience of the traders.

March 3rd, 1881.

Selected boat-guards and counters. All establishment now ready. Boats numbered. Wind, however, fresh from land all day, and no sign of sea-breeze. Decided not to send boats out. Merchants came to the bungalow, inspected sample, and put their own valuation on it Returned to the *Geraldine* in the evening.

Landed in the afternoon; exhibited the sample to the merchants.

PEARL FISHERY, 1881.

DIARY.

Two vessels arrived with traders and merchandise from Colombo and Kilakarai. Made final arrangements to commence the fishery to-morrow morning, fine fresh north-westerly breeze having set in at noon, shewing that the weather has apparently set in fair.

Boats ordered to be in readiness to start for the banks (red division).

This year four constables of the Jaffna force were selected for counters with the consent of the Inspector-General of Police; as I found the force sent for duty here too small in reference to the large assemblage this year, these men were ordered to do duty with the force, constable Ayasamy being appointed acting sergeant.

March 4th, 1881.

Boats started for the banks, to commence fishing, at 9 last night with fresh land breeze, the *Geraldine* leading. Fishing commenced at about 8 A.M. Fine morning for fishing Sea-breeze at noon. Fishing continued up to 1 P.M., when boats were sent in with fresh breeze from N N.W. Loads comparatively small Government shares only 318,000, making, with divers' one-third, a total haul of 477,000.

The ground fished to-day is in the south-east of the bank to be fished. The oysters were much scattered over it; divers bringing up only from 4 to 10 at a dive. Ninety-one boats in all (90 red, 1 blue) went out. Some got on the bank rather late. There seems to be only divers sufficient to afford the full number of 10 to a boat, from 75 to 80 boats.

Returned from the bank in the steam launch, and held a sale immediately on landing. Disposed of all the oysters at 25, 23, and 22 rupees the thousand. The sale bungalow was well attended, all the principal merchants having been there.

The small traders seemed reluctant to go in for the oysters, and the lots were chiefly knocked down to the leading merchants. Some kullus from Negombo were hauled up on the beach ready to start for Colombo with oysters. The divers sold their shares at from 25 to 50 rupees the thousand.

Beautiful fishing day—calm during forenoon with fresh sea-breeze in the afternoon. Boats got in early, first boat at 3·20 P.M.; one boat brought in a load of 10,000, and another only 1,200, having reached the bank late.

Inspected the cholera and small-pox hospitals at Pulipanjodai in the evening accompanied by the Adikar of Músali. Ordered Adikar to employ a kangani and two patrols to watch the buildings and wells.

March 5th, 1881.

Blue division fished to-day. Went out last night with the boats in the launch; reached the *Geraldine* at midnight. All boats out and at anchor round the schooner by about 2 A.M Fishing commenced at 8 A.M, there having been a little sea with fresh land-breeze from the east early in the morning. The *Geraldine* was shifted after boats left a quarter of a mile to the west Beautiful weather, calm during forenoon and noon, with fresh westerly breeze, which kept up till 6 P.M. during the afternoon. Boats in early; loads similar to those of yesterday; oysters more scattered according to report of the divers.

Held a sale on landing; sold all the oysters at 26, 27, and 25 rupees the thousand. Divers sold their shares at from 18 to 25 rupees. Government share 318,000. After the sale assembled the tindals of red division, and ordered them to be ready to start for the banks at 9 P.M., and directed them, as requested by Captain Donnan, to anchor close round the *Geraldine* and fish over the ground within four buoys forming a square, at each of which a guard boat would be stationed.

Went round the town, divers' quarters, &c. Place tolerably clean. It is represented to me, however, that owing to the large gathering here this year, more scavengers are required.

Ordered Adikar to select sixteen more scavengers and two more kanganies, and told Mr. Navaratnasingam to alter his divisions. Gave him full instructions again as to what is to be done in the way of sanitation—ordered him not to bury any filth in the compounds, but to remove and burn it—when it cannot be burnt, to remove and bury it beyond the boundaries The two spring carts hired and kept in readiness for the removal of patients to hospital in the event of the outbreak of an epidemic are placed at the disposal of Mr. Navaratnasingam till required

March 6th, 1881.

Started the red division off at 9 last night with light land-breeze; sent the launch to anchor beyond the reef, with orders to show a good light so that the boats might steer for her, and from her to the *Geraldine*, and in the morning to come in to Silávatturai for me Left Silávatturai at 7 A.M. in launch, accompanied by Mr. Hawkes of the Public Works Department, Trincomalee, and Mr. Heath of the Ordnance Department, Trincomalee, who had come to see the fishery, and Mr. Clark of Travancore, brother of the Forester of the Northern Province.

Reached *Geraldine* soon after 10 A.M. Went round amongst diving boats in the launch with Captain Donnan and the visitors. Notwithstanding all the orders given to the tindals, and all that the divers said yesterday as to there being no oysters, the boats had all gone to the ground fished yesterday. Tried to persuade the tindals and divers that they were wasting much valuable time in wandering over the bank, instead of remaining on one spot and fishing up what they could get. They stated in reply that there were no oysters, and that there were a large number of dead shells. The first statement was disproved by the numbers brought up in the nets brought to us for inspection, in which were 6, 10, 12, and 20 at a dive. There is no doubt however, that the oysters are fast dying off, as in 1863, a large proportion of dead shells having been brought up in the nets, many of oysters that have recently died off.

Stopped diving at 1 P.M.: loads smaller than those of yesterday, Government share only 292,000.

Held sale immediately on landing; sold off all at 26, 27, and 28 rupees the thousand, divers selling at from 26 to 30 rupees. Assembled all the tindals of both divisions and repeated the orders given

yesterday, and warned tindals of red division; ordered blue division to be ready to proceed to the bank.

Beautiful day again; weather as yesterday.

7th March, 1881.

Started blue division out at 9 P.M. last night with light land-breeze.

Went out in launch, reaching *Geraldine* at 13·0 A.M.; boats all out early with fresh land-breeze. Fresh land-breeze and some sea on bank, diving did not therefore commence till 8 A.M; boats again over ground beyond buoys; coxswains reported large number of dead shells brought up by divers.

Captain Donnan decided on moving the *Geraldine* to centre of southern half of the ground to be fished, and then to let the boats fish anywhere they liked over the southern half of the bank, instead of fishing in sections as he originally intended to do. The guard boats were recalled, and the coxswains told not to interfere with the diving boats, but to allow them to fish wherever they liked over the southern portion of the bank.

Caused some nets of dead shells to be brought to the ship. Many of them were of oysters that have recently died, and there can be no doubt that the oysters have reached maturity and are now dying off.

Stopped fishing at 1 P.M. and sent boats in with fresh north-westerly breeze. Followed in launch. Boats all in early. Oysters all counted when I landed. Loads small. Government share only 272,000. All sold at 27 and 30 rupees the thousand.

Traders complaining much of the small loads, which they say do not meet the conditions of the advertisement of the fishery. Impression evidently abroad that we are not fishing the bank properly, and are purposely bringing in small loads in order to keep up the price of the oysters.

Beautiful day; calm at noon with fine north-westerly breeze in the afternoon till 5 P.M.; when the wind went round and blew from the land.

8th March, 1881.

Red division fished to-day. I last night caused the divers in each boat to be counted. From the account taken, it appears that there are now in Silávatturai divers sufficient to give the full number of 10 to each boat for 95 boats.

Eighty-eight boats went out with the full number, ten in each, ten with only six and eight, and I was informed that some divers could not go out as they were suffering from ear-ache. The boats were started off last night with light land-breeze, which freshened up, however, when the boats were beyond the reef. Boats all but one, which ran past the ship, on bank by 2 A.M. Diving commenced at 8 A.M, land-breeze being fresh in the early morning with some little sea. The boats fished wherever they liked round the ship, but were not allowed to go to the northern patch. With every advantage of fine weather, and what was supposed to be the best part of the bank for the boats to fish over, the loads did not come up to what it was expected they would; one boat brought in 14,000, but the average seemed to be about 5,000. Stopped diving at 1 P.M., sent in boats with fresh north-north-westerly breeze. Fine day again for fishing. According to reports of divers, from five to seven dead shells were brought up at a dive, and from ten to fifteen live oysters. Boats got in well although the breeze headed them when they passed the reef; one was driven to Condatchy, but all were in and oysters counted by 5·30 P.M.

Held a sale on landing from the launch. Government share 442,000, sold for 11,000 rupees, at 25 and 26 rupees the thousand.

The wind held up almost all day from the east, I am informed, at Silávatturai, and whilst the boats were coming in with a fresh north-north-westerly breeze from the bank, it was blowing from the east in Silávatturai up to the reef, when, as above remarked, the boats were met by the land-breeze as they got within the reef.

9th March, 1881.

Blue division, in all 96 boats, went out last night with light land-breeze. I sent launch out to anchor beyond reef and show a light as a mark for the boats, with orders to come to take me to the bank in the morning. Went to bank in the forenoon accompanied by Mr. Simpson of the Telegraph Department, reaching the *Geraldine* at about noon. Beautiful day for fishing; calm in the forenoon with fresh north-westerly breeze during the afternoon.

Stopped diving at 1 P.M.; loads smaller than those of yesterday. Boats all in early, and oysters counted. Government share only 414,000. All sold at 28 and 27 rupees the thousand.

10th March, 1881.

Red division, 100 boats, and two boats without numbers, which arrived late yesterday, went out to banks last night, in all 102 boats.

Fine morning for fishing. Fishing continued up to 1 P.M. Loads smaller than those of yesterdays. Inspection vessel shifted to north-west half a mile.

Fresh north-westerly breeze during afternoon. Boats all in early. Held sale on landing. Government share only 342,000; all sold at 30 and 31 rupees the thousand.

Some more petty traders and four diving boats with divers arrived to-day. There are now divers sufficient for 100 boats. Weather fine: no rain as yet, sun very powerful.

11th March, 1881.

Blue division fished with five boats recently arrived and without numbers, in all 105, six of them with only six and eight divers. Better loads to-day—5,000 to 18,000—from a patch north-east of the ship. Beautiful day for fishing. Fishing continued up to 1 P.M. Boats started with light westerly breeze.

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11th March, 1881.

Went with Captain Donnan in steam launch to look over the ground fished in 1879, viz., the Perea Paar or Kotapaku Paar, to see if the young oysters found on it in November last were still there. Found the bank clear of oysters, old or young. Returned to ship at noon.

Boats in early with fresh north-westerly breeze, the wind having freshened up and gone round to north-west after the boats left the ship.

Government share 542,000—all sold at 30, 31, and 32 rupees the thousand.

12th March, 1881.

Red division went out last night, in all 105. Fished on same ground as yesterday. Loads not quite so heavy.

Went out in steam launch at 8 A.M., accompanied by Mr. & Mrs. Haughton and Mrs. Ashe, who wished to see the diving. Beautiful day for fishing.

Divers complain very much of the coral growing on the oysters, which cuts their hands. Almost every oyster has a growth of coral on it, which gives much trouble to the divers. Oysters dying off.

Stopped diving at 1 P.M., and sent boats in.

Fresh north-westerly breeze during the afternoon, and boats got in early.

Government share 518,400. All sold at 27, 28, 29, and 30 rupees the thousand.

13th March, 1881. *(Sunday.)*

Divers would not go out last night, saying they wanted rest.

Numbered some more boats, making 105 for each division.

Weather fine. Land breeze till about 10 A.M., then calm with north-westerly and northerly breeze during the afternoon. Clouds beginning to bank over the land to-day.

As there will be no work in the kottu to-morrow morning, the oysters having been all removed, ordered the Inspector of Police to take all the kottú coolies and scavengers and clean the ground beyond the boundary of flags, so as to make the drainage into the tanks as free from filth as possible in the event of rain.

14th March, 1881.

Blue division, 105 boats, fished to-day. Boats reached inspection vessel early last night with fresh land-breeze. All boats but four with full complement of divers, some more divers having arrived during the last two days. There are now divers sufficient apparently to fully man 103 boats—the largest number that has come here for any fishery since 1837.

Went out to the bank at 10 A.M. in the launch, reaching the inspection vessel at about noon. Found the boats fishing north and north-west of the vessel and getting large loads. Divers complain much however of the coral on the oysters. Light north-westerly breeze set in at 1 P.M. Boats sent in. Breeze freshened up during the afternoon; boats in early; oysters all counted by sunset.

Followed in launch, reaching shore about 6 P.M. Held a sale. Large attendance of Chetties and other traders. Government share 902,600, sold at 26 and 27 rupees the thousand. Weather fine throughout the day. Calm at noon with fresh north-westerly breeze from 1·30 P.M. till evening. Clouds banking up over the land in the afternoon.

Stories in circulation amongst the traders to the effect that the oysters brought to-day are smaller than those of previous days.

15th March, 1881.

Red division went out last night with light land-wind which freshened up during the night All boats reached the bank, Captain Donnan informed me, by 1 A.M.

Went out in launch at 9·30 A.M., reaching bank at about noon.

Went round amongst diving boats, which were fishing on same ground as yesterday. Oysters plentiful, not dying off apparently on this patch of bank. Heavy loads; divers bringing up from 15 to 40 oysters at a dive.

The bulk of the oysters are covered with tree coral. I have never seen the coral on the oysters so large at previous fisheries

The divers say that the oysters are lying thick on the patch now being fished. There seems to be some difference in the size of the oysters as compared with those on the southern patches. They are certainly smaller. Captain Donnan, however, says that they are all of one brood. Perhaps the coral has interfered with their growth. I was told this morning that some of those fished yesterday and opened by the purchasers yielded a fair return in pearls.

Stopped diving at 1 P.M. Boats started with light westerly and north-westerly breeze, which freshened up and went round to north-west.

Followed in launch, reaching shore by 5·30 P.M. Held a sale; sold all at 25 and 26 rupees the thousand.

Government share 938,000.

16th March, 1881.

Blue division fished. 106 boats went out in launch at 9·30 A.M., reaching ship at 11·30. Found boats fishing on same ground. Captain Donnan informed me that the land-wind reached the vessel at about 8·30 last night, blowing fresh. All boats out early. Fishing did not commence till nearly 9 A.M., owing to a chopping sea and cold land-wind which made the divers reluctant to begin

Diving stopped at 1·30, and boats started from bank at 2 P.M., with light north-westerly breeze, which freshened up during the afternoon. Loads not so heavy as those of yesterday owing, as the divers say, to the difficulty experienced by them in getting hold of the oysters on account of the coral growing on them.

They reported plenty of oysters, sufficient for fifteen days' fishing, on this part of the bank.

Boats in at about 4 P.M. Followed in launch, reaching shore at 5 P.M. Held a sale. Disposed of all the oysters at 25, 26 and 27 rupees. Government share 744,000. Land-wind set in fresh at about 7·30 P.M., but fell light again at 9 P.M. Clouds over land indicating the approach of squalls off the land, such as one usually experienced during a fishery, and which interferes with the boats getting in from the banks.

Weather still very fine for fishing.

17*th March*, 1881.

Red division 106, and Blue 1, in all 107; boats fished to-day till 1·30 P.M. All but thirteen fished on same ground as yesterday, thirteen a little more to the westward in a group on a spot where there were good loads. Divers report oysters very thick in heaps under oysters with coral on them. They complain very much of their hands being cut by the coral on the upper layer of oysters.

Good loads. Boats started from bank at 2 P.M., with fresh westerly breeze. Heavy banks of clouds rose over the land with thunder and lightning. The sea-breeze, however, kept the land-breeze back till about 6 P.M., and the boats all got in. I reached Silávatturai in the launch at 5·30 P.M.; clouds black over the land, but there was only a slight drizzle in Silávatturai, though inland there must have been heavy rain. Government share of oysters 780,000, all sold for 29 and 30 rupees.

Some more traders and divers arrived, I am informed, yesterday and to-day.

18*th March*, 1881.

Blue division, 106 boats, fished to-day. From 6 P.M., to midnight, it was almost calm on shore with a cloudy sky and occasional drizzling rain, and it was with some difficulty that the boats were started. By midnight, however, all had gone. Captain Donnan informed me that they did not reach the bank till 4 A.M., and many were off the bank to leeward at daylight, and had to pull up to the bank.

Went out in the launch at 9·30 A.M., reaching ship at 11·30. Went round in the launch with Captain Donnan amongst the diving boats which, with the exception of a few on the ground fished yesterday, were fishing more to the westward. Divers report plenty of oysters without coral on them, but many covered with weed. Fair loads. Light westerly breeze set in at noon with heavy clouds banking over the land. Boats ordered in at noon. When about one-third of the way in, at 1·30, a heavy squall of thunder, lightning, and rain came out from the land, which obliged the boats to anchor. The squall reached the ship at about 2·30 P.M. Heavy rain till about 3 P.M., when it began to moderate. Left the *Geraldine* at 3·30 in the launch, and steamed in the direction of Kudrimalai to advise some of the boats to return to the ship. Succeeded in sending back five; the others except one got up sail and bore up for Aripu, the wind gradually going round to south and then to south-east.

Picked up a Jaffna boat at anchor about three miles from the ship and towed her down to the reef; cast her off there, and after placing the small boat belonging to the launch near the reef with two men in her and a lantern to serve as a mark for the reef, steamed back towards Kallár in search of two of the guard boats which left the ship after the boats, and were caught in the squall Found one and took it in tow, but could not come on the other.

It being impossible to do anything outside of the reef for the boats which had gone in the direction of Aripu, steamed back to Silávatturai, picking up near reef another diving boat at anchor, which was taken in tow.

The rain ceased at sunset, the wind fell, and the clouds cleared off as we steamed into Silávatturai. On landing was informed that 32 boats had arrived. Five had returned to the ship. Sent the launch towards Aripu to tow up any boats she might come across. She made three trips bringing up 5, 7 and 2, in all 14 boats.

I was informed that there had been squalls of thunder and lightning accompanied by a little rain during the afternoon from 1 P.M to nearly 6 P.M.

The first boat did not get in till 6 P.M.

19*th March*, 1881.

The kottús were kept open till 2·30 A.M., as the boats came dropping in one by one all night. All in, in the morning, but eight. Those in brought good loads. Government share 689,000.

Sold at prices between 35 and 43 rupees.

Wind from the land all day till about 4 P.M., when it went round to the north.

Sent launch out to bring Captain Donnan in, to-morrow being Sunday.

19*th March*, 1881.

Heavy banks of clouds over the land with distant thunder and lightning; very little rain. The remaining boats came in during the day; those near the ship having fished during the forenoon. Sold all the oysters at between 40 and 45 rupees the thousand.

20*th March*, 1881. *(Sunday.)*

Wind steady and fresh all day from the land; no rain though clouds banked over the land. Ordered red division of boats to go out. Verified cash in Treasury.

21*st March*, 1881.

Red division, 107 boats, fished.

Weather favourable for fishing during forenoon. Went out in launch with Captain Donnan. Good loads; boats sent in at 1·30 P.M., with fresh westerly and north-westerly breeze. When about

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half way in, however, the land-breeze met them, and they all ran down towards Kullar; some were driven to Pûkulam and Kudrimalai.

Left inspection vessel at 4 P.M. reaching shore at 6 P.M.; no boats in. The first boat came in at about 7 P.M., and all were in by 1·30 A.M. of 22nd, but twenty. The kottú was then locked up, as there were no signs of the missing boat.

Gave orders to notice boats of blue division to go out at any hour up to 6 A.M. of 22nd. Weather fine, no rain I was told on landing that there had been no sea-breeze at all in Silávatturai. The land-breeze fell, and it was quite calm when I landed, but the sea-breeze was not felt within the reef

Mr. Parker, Irrigation Engineer, met me on landing.

22nd March, 1881.

All boats in but two by 9 A.M. No sign of the missing boats. Sold all the oysters off at 35 and 36 rupees the thousand. Government share about 828,000.

An attempt was made last night to lower the price of the divers' oysters, but the divers held out and the price went up to 35 rupees the thousand. The intention was apparently to bring the price down to 15 rupees the thousand, if possible, in the hope of bringing down the price in the sale bungalow, if the attempt succeeded with the divers.

Seventy-nine boats of the blue division reached the bank, and I found on reaching the ship in the launch that the two missing boats of the red division had returned to the ship and fished during the forenoon. The boats started from Silávatturai at from 4 to 6 A.M. Some did not reach the ship till nearly 10 A.M; the loads were not in consequence very heavy. Boats started from ship with fresh north-westerly breeze at 1 P.M. Breeze held up and boats got in early. Government share 452,000. All sold at 37 and 38 rupees the thousand. Blue division ordered to go out again to-night, as they have not had a fair day's fishing.

23rd March, 1881.

Blue division fished to-day as ordered; boats reached bank early with fresh land-breeze. Fine morning for fishing; loads however smaller, and signs of oysters beginning to die off.

Fishing stopped at 1 P.M., and boats sent in with fresh north-westerly breeze; all in by 5 P.M, and oysters counted. Government share 609,000; all sold at 37, 38, 39, 40, and 41 rupees the thousand.

Went out to the bank in the forenoon accompanied by Mr. Parker, who wished to see the diving. The oysters are evidently beginning to die off now on the part of the bank recently fished. In fact the bank is being fished just in time. I have heard that the merchants and traders have remarked that the oysters are as they term it "fully ripe."

I noticed several shells of oysters that have recently died off in the kottú amongst the loads brought in by the divers.

24th March, 1881.

Red division and one blue division, in all 107 boats, fished to-day; fishing more on the north-east of the bank. Divers complain again of the coral on the oysters; loads about the same as yesterday. Fishing stopped at 1 P.M., and boats sent in with fresh north-westerly breeze. All got in by 5 P.M., although met by the land-breeze when within the reef. Oysters all counted by 5·30 P.M.

Heavy clouds over the land in the evening, but no rain. Held a sale on landing. Competition not so brisk as before; highest offer 30 rupees the thousand. When about half the oysters were sold, the price went down to 29 rupees the thousand, below which I refused to sell, as it was quite clear that certain of the Chetties were endeavouring to gradually bring down the price. The whole balance was ultimately sold at 29 rupees the thousand to the "Kateeb."

25th March, 1881.

Blue division fished to-day, boats in all 105. Land-breeze, Captain Donnan told me, kept up all night, and blew strong for some time. Boats out early, but diving only commenced at about 8 A.M.

Beautiful weather: during forenoon calm, with the sea like a sheet of glass till 1 P.M. Boats fishing very much on same ground as yesterday; loads smaller than those of yesterday. Bank shewing signs of exhaustion, and we must not expect large loads in future.

Boats sent in at 1·30 P.M., with very light north-westerly breeze. Followed in launch at 4 P.M., reaching Silávatturai at 6 P.M. Boats in by 5·30 P.M., and oysters all counted by 6 P.M. Held a sale and disposed of the oysters at 25 rupees the thousand; attempts being made to bring the price down to 15 and 20 rupees.

Question asked during the sale, if we were fishing the same bank, and if the sample was taken up from the patch on which fishing was carried on to-day, the oysters being, it was said, younger and smaller. There certainly appears to be some difference between the oysters fished on the north as compared with those on the south. The oysters on the north are, however, very much mixed, *large* and *small*, which was not the case in regard to those fished on the south.

There being a large assembly of traders at the sale bungalow, I explained to them that they must not now look for any more large hauls, as the bank is showing signs of exhaustion. Notwithstanding all I said, however, many of them held back during the sales on the idea that the boats had brought in a large number of oysters, and were quite surprised when I informed them that the Government share only amounted to 540,000, and that they were all sold.

26th March, 1881.

Red division fished on ground west of ship between centre and south buoy of northern patch. Beautiful day again, weather as yesterday. Loads much the same. Fishing stopped at 1·30 and

boats started at 2 P.M. with light westerly breeze. All in in good time. Government share 570,000; oysters all sold at 26, 27, 29 and 30 rupees the thousand.

Captain Donnan landed with me in launch, to-morrow being Sunday.

Silávatturai, 27th March, 1881.

Verified to-day all the cash. Weather fine, the weather being favourable for fishing and apparently settled, and everything in working order. Made arrangements to proceed to Jaffna to-night for a few days, leaving all matters connected specially with the fishery with Captain Donnan, who will send me a telegram daily regarding all that goes on.

Gave all necessary instructions to Inspector of Police and other officers. Arranged to take with me 74,026 rupees in silver.

JAFFNA.

29th March, 1881.

Reached Jaffna at noon to-day, having been detained on the way by calms. Paid money over to the Bank.

SILÁVATTURAI.

8th April, 1881.

Returned to this this afternoon, having left Jaffna yesterday at 6 P.M.; arrived in time to see the boats come in, and to hold the sale. Captain Donnan landed at about 5 P.M. Held sale when the oysters were counted. Sold all at 40, 41, 42, and 44 rupees. Government share 254,945.

Captain Donnan informed me that the weather had been beautiful during my absence. The boats were delayed only on one night by a land squall, but not for any time. There has not been much rain, though there were three or four land squalls.

Went round town after the sale; all clean and in good order.

Annexed are the Telegrams received by me, whilst in Jaffna, from Captain Donnan :—

To Jaffna : Government Agent. From Silavatturai : Captain Donnan.

March 29th, 1881.—106 boats brought 500,770 oysters Government share. Sold at 42, 43 and 44 rupees the thousand; realized 21,578 rupees. Total 354,973 rupees. Rain with squalls from land in afternoon. All's well. Boats went out last night.

March 30th, 1881.—107 boats brought 426,145 Government share. Sold at 36 to 40 rupees the thousand; realized 15,636 rupees. Total 370,609 rupees. Rain with squalls from land afternoon. All's well. Boats went out last night.

March 31st, 1881.—106 boats brought Government share 528,040; sold 32, 33, 34, and 39 rupees the thousand; realized 17,361 rupees. Total 387,970 rupees. Rain with squalls from land afternoon. All's well. Boats went out last night.

April 1st, 1881.—107 boats brought Government share 390,640; sold 35 to 38 rupees; realized 14,192 rupees. Total 402,162. All's well Boats went out last night.

April 2nd, 1881.—106 boats brought Government share 403,520; sold at 43 to 45 rupees; realized 17,619. Total 419,781. Boats went out last night. All's well

April 2nd, 1881.—107 boats brought Government share 530,295; sold at 44, 45, and 46 rupees the thousand; realized 23,559 rupees. Total 443,340 rupees. All's well

April 4th, 1881.—107 boats brought Government share 376,545; sold at from 40 to 43 rupees; realized 15,468. Total 458,808 rupees. Boats go out to-night. All's well.

April 5th, 1881.—108 boats brought Government share 513,780 oysters; sold at from 33 to 35 rupees the thousand; realized 17,120. Total 475,928 rupees. Boats go out to-night. All's well.

April 6th, 1881.—106 boats brought Government share 327,985 oysters; sold at 34 and 35 rupees the thousand; realized 11,295 rupees. Total 487,221 rupees. Boats go out to-night. All's well.

April 7th, 1881.—106 boats brought Government share 320,890 oysters; sold at 37 and 38 rupees the thousand; realized 11,899 rupees. Total realized 499,120. Boats go out to-night. All's well.

SILAVATTURAI

9th April, 1881.

Red division and one Blue, in all 106 boats, fished to-day. Brought in Government share 297,000 oysters. All sold at 41, 42, 43, 44, 47 and 48 rupees the thousand Boats got in early. Weather still fine.

10th April, 1881. *(Sunday.)*

No fishing to-day. Weather fine. Inspected in the afternoon (accompanied by Captain Donnan) the divers' quarters. All clean.

11th April, 1881.

Some of the boats were with difficulty started for the banks last night. Only five, however, succeeded in reaching the bank; the others having started late, were met by the south-westerly breeze when just beyond the reef. The five boats brought in Government share 4,600 oysters, which were sold at 50 rupees the thousand.

PEARL FISHERY, 1881.

DIARY.

12th April, 1881.

The boats were ordered out again last night—97 reached the bank, and fishing commenced. Soon after an alarm of a shark on the bank was made, similar to that made in 1877, and diving was stopped for over two hours, and it was with great difficulty that the divers were induced to begin diving again.

The boats were kept out till 3 P.M.

The loads were, however, small. Government share only 43,331, which sold at from 52 to 62 rupees the thousand.

A beautiful day was lost by the false alarm which was raised. The boats from which the alarm was raised, and one boat in which the divers would not work when ordered, were brought alongside the inspection vessel, and the divers made to dive; all the oysters being taken on board the inspection vessel and sent on shore in the launch to the kottú.

13th April, 1881.

The divers refused to go out last night, and when the Inspector of Police was sent to turn them out, many ran into the jungles, and others tried to conceal themselves in the huts. Not a boat had started by 11 o'clock. I went down to the divers' quarters, accompanied by the Inspector of Police, Adikar of Músáli, shroff, and other officers of the fishery, and after some trouble, managed to get about fifty boats started by 2 A.M., forty-nine of which reached the bank. I followed in the launch at 3 A.M. under sail. In reference to information given to me as to what was going on amongst the boatmen and divers, I was prepared for some trouble in getting the boats out this week, the advertised number of fishing days having expired on Thursday last the 7th. Some boatmen of Tuticorin then gave out that they wanted to return to their country. I believe, however, that one of the chief causes for the reluctance on the part of the divers to go out is that they have not entered into fresh agreements with the boat-owners, and that the boat-owners wanted in consequence to take advantage of them, the boats being still worked in two divisions—Red and Blue. I gave out therefore to-day that the two divisions—Red and Blue—were to be considered broken up, and that any boats that could get divers might go out.

Diving has been carried on for some days on the south of the bank. The vessel was moved again to-day to the northern patch.

14th April, 1881.

112 boats went out last night and brought in Government share 292,000 oysters, which were sold at 28, 29 and 33 rupees the thousand.

Weather fine. No trouble with the divers to-day.

15th April, 1881. (Good Friday.)

Only Moorish divers went out to-day, the Roman Catholic divers having begged to be allowed the day as a holiday.

Only thirty-eight boats went out; brought in Government share 98,000 oysters, which sold at 34 and 36 rupees the thousand. Went out under sail in the launch in the morning; sharp squalls of thunder and lightning with a little rain at 6 P.M.

16th April, 1881.

112 boats went out last night. The wind went round to south-west before half of them reached the bank. I went out under sail in the launch during the night, but was met by the south-west wind at about 4 A.M., when about three miles from the ship. Seeing that a number of boats were at anchor unable to get to the bank, anchored and got up steam, and at 5 A.M. steamed towards the boats and towed seven up to the bank. The launch in three more trips towed twenty-one boats to the bank; others managed to beat up to the bank, and reached it by 10 A.M., and all were on by 11·30. Beautiful day for fishing. Loads comparatively small, most of the boats having reached the bank late.

Boats got in early with fresh sea-breeze. Government share 160,000. Sold at 39 and 40 rupees the thousand. Divers now quite satisfied, and say they will fish as long as the weather is favourable. I believe that much of the trouble during the week has been owing to the Tamil and Roman Catholic holidays falling in the same week.

The Tamils and Roman Catholics wished to have the three days—12th, 14th, and 16th—and some pressure was put on the Moorish divers to prevent their going out; and as they had in common with the Tuticorin divers made a good thing of it during the fishery, they were not altogether unwilling to go in for three or four days' holiday. The alarm of the shark was got up on the morning of the 12th (the Tamil new-year), I believe purposely to stop diving, in the hope that the boats would be sent in early, if the divers refused to dive any more. The boats were kept out, however, as already remarked, till nearly 3 P.M. Captain Donnan accompanied me in the launch, to-morrow being Sunday.

17th April, 1881. (Sunday.)

No fishing. Weather fine.

18th April, 1881.

Boats went out and fished near the inspection vessel, near the northern patch. Brought in Government share 162,000. Sold at 41, 42 and 43 rupees the thousand. Weather fine.

Yesterday two Paumben dhonies from Colombo anchored off Condatchy, with the intention of taking away divers and petty traders. During the night one was seized with about forty traders and twenty divers on board, whowere shipped without the knowledge of the Customs officers.

The passengers were taken out, and both vessels detained ; the divers were ordered to go out to the banks.

19th April, 1881.

Ninety-eight boats went out. Fished on same ground. Brought in Government share 211,770 Sold at 40 and 41 rupees the thousand. Weather fine.

20th April, 1881.

103 boats went out. Fished on same ground with the exception of a few, which went to the southward. The northern patch is now getting exhausted.

A land squall of thunder, lightning and rain struck the boats, when most of them were in shore off the reef.

Anchored the launch during the squall just outside, and then towed in the boats which had anchored outside, and some which were pulling in. A south-easterly breeze springing up, all except those which had gone towards Arippu were enabled to get in. The launch went down towards Arippu and towed up two boats from the Doric. All were in by 8 P.M., and oysters counted by 9.

Government share 250,000, sold at 41 and 42 rupees the thousand.

21st April, 1881.

Ninety-five boats fished to-day. Beautiful weather still. Squall from land in the evening. After boats got in every appearance of heavy rain, but squall passed over with little rain. Sold oysters at 37, 39, and 40 rupees the thousand Government share 197,000. Many of the petty traders have left the place during the last two or three days.

22nd April, 1881.

Eighty-nine boats fished to-day. Brought in Government share 152,000 oysters. Sold at 35 and 36 rupees the thousand. Clouds thick over the land in the evening, with distant thunder and lightning

23rd April, 1881.

Eighty boats fished to-day. During the last two days the boats have been gradually leaving the northern patch and fishing some distance to the south of the vessel. Weather still fine. Heavy clouds over the lands especially in the direction of Marchikatty and Kudrimalai. No rain in Silávatturai. As the weather seemed settled for a few days, persuaded the divers to remain in the place and fish on Monday and Tuesday, as there are still some oysters on the bank. They were to have been allowed passes for their boats to-night. Some have gone away by land, not caring to go out any more, as some difficulty is now experienced in getting remunerative loads. All are complaining more or less of being tired, and some of severe pain in the chest brought on by continuous diving for over forty days. They state that in former fisheries, owing to a break in the weather, they always got a few days' rest, whereas this year they have fished almost every day except Sundays from the 4th March.

Many of the petty traders have left the place by land during the week, and about 200 or 300 divers have also gone away by land. Aliadiverayan Chetty and the rest of the Comatty Chetties go away to-night. The Kateeb and his party are here, and will remain till the close of the fishery. Could only dispose of 25,000 oysters at 35 rupees the thousand.

Captain Donnan accompanied me on shore in the launch after moving the inspection vessel to the centre of the bank, the northern patch being now fished out.

24th April, 1881. (Sunday.)

No fishing ; sold off balance of oysters at 30 rupees the thousand. Great objection amongst traders to oysters of northern patch, which they say are smaller than those of the southern part of the bank and not so rich in pearls

Weather fine. Heavy banks of clouds with distant thunder and lightning over the land and towards the south-east ; sea-breeze during the afternoon.

25th April, 1881.

Only 64 boats fished to-day on south of bank over ground fished on the first day, and between it and the ship. Weather still fine, boats well in with sea-breeze. Government share 127,000, sold at 38, 39, 40 and 42 rupees the thousand. One diving boat was capsized coming in ; towed her in.

A violent squall of thunder, lightning and rain (the heaviest during the fishery) came off from the land, just as the launch got off the kottus and cast off the boat. Detained in launch by heavy rain till nearly 7·30 P.M. Held sale immediately on landing, the sale bungalow being well attended.

26th April, 1881.

About eighty boats started for the bank last night, most of them, however, very late indeed, and only twenty-eight reached the bank, the south-west wind having set in early and driven the others back to Silávatturai. There was a heavy swell with chopping sea and strong south-westerly breeze on the bank during the forenoon, which interfered much with the divers. Towards 2 P.M. however the wind and swell went down considerably The boats were sent in at 2 P.M. The launch was sent round to pick up some of the buoys. This was to have been the last day of fishing, but as only twenty-eight boats reached the bank, and there was some prospect of the weather being favourable for fishing to-morrow, the divers were persuaded to make arrangements to go out to-night on the promise that passes would be given to all boats, dhonies, &c., to-morrow evening.

PEARL FISHERY, 1881

DIARY.

Almost all the boats got in by 5. Towards evening the sea-breeze, which had been blowing fresh all day on the bank, went down, and at 5 P.M. it was almost calm, and the launch towed in three of the guard boats and seven diving boats which were becalmed between the reef and the shore.

Loads small. Government share only 30,315. All sold at 43 rupees the thousand to a Chetty of Ramnad.

27th April, 1881.

Eighty-three boats fished to-day. I ordered coxswain Sevekinu to count the divers in each boat before the boats went in. He got the account from all but three boats. The result showed that the boats worked to-day, the last day of the fishery, with an average of eight divers to a boat, making in all about 660 divers on the bank, enough to afford full complement of ten each for sixty-six boats Beautiful morning for fishing. Sea-breeze set in at about noon. Boats sent in at 2 P.M. The buoys were all raised, and Captain Donnan and I followed in the *Geraldine*, the launch keeping company. As the wind became light, we got into the launch and steamed in to Silávatturai; landing at about 6 P.M. Oysters all counted by the time we get in. Held a sale on landing. Very few traders in attendance Sold about 41,000 at 47, 46, and 45 rupees the thousand, and then closed the sales, as there were no offers for more at 45; and I declined to sell under that rate. 8,000 more subsequently sold during the evening at that rate.

Sent orders to the Sub-Collector to give passes to all boats, &c., applying for them.

Two schooners, the *Rose* and *V. M. Joseph St. Anna* of Tuticorin, have been waiting for some days to take away traders, divers, and their families to Tuticorin.

Weather fine—clouds over the land as before in the evening. Paid off boat guards in the evening.

28th April, 1881.

Ordered all establishments to be paid up to 30th Held a sale. Disposed of remaining oysters at 40 rupees the thousand, also sold the samples of November and February and the sweepings of koṭṭu ground, bringing up proceeds of fishery to 599,533 rupees.

The sea-breeze kept up last night, and the boats could not have gone out.

1st May, 1881. (Sunday.)

A large number of the traders and all the boatmen and divers have gone away. The Kateeb and his party left last night.

The Customs Department, the Medical Department, the Mannár establishment, the Koṭṭú Establishment (excepting two of the clerks, Messrs. Bertus and Tamoderampillai, whose services are required here), the Government divers and manducks, the coxswains (except Philip) and boatmen and the Beachmaster's establishment have all been paid off, and all have left the place except coxswain Sevekinu. Coxswain Philipo will return to Colombo in the inspection vessel, and coxswain Sevekinu will go in a day or two to Devipatam to his ship employed in the immigrant service.

Mr. Navarotnasingam will remain with the scavengers till the place is clear.

The wind seems now to have fairly set in from the SW The boats might perhaps have got to the bank on the 30th, and might have gone out last night, the wind having gone round and blown from the land for a time. I am doubtful however if they could have succeeded in reaching the bank, as I believe the land-wind would have failed them when beyond the reef.

3rd May, 1881.

Engaged the last two days closing accounts, getting treasure ready for despatch to Colombo, &c.

Captain Donnan, Colombo Police under Inspector Trevena, Shroff, and Comcoply with treasure, and coxswain Philip embarked yesterday in *Geraldine*, which sailed at 5 A.M to-day for Colombo. Wind blowing in fresh from south-west all day. *Geraldine* in sight, hull down in direction of Kudrimalai at sunset.

The divers' quarters are now all deserted, and the remains of the huts, &c., nearly all burnt out. The bazaar is however still tolerably full.

The last day's oysters are now being washed.

7th May, 1881.

A number of the Moorish traders from Kilikúrai, &c., came to pay their respects and take leave to-day, having completed all their business here.

The oysters have all been washed, and the bazaar is now nearly empty.

Arrangements will be made for all remaining here to leave to-morrow, except the Post and Telegraph establishment which will remain till the 10th, on the request of some of the traders who are stopping and expect money by post.

The Jaffna police, 3 sergeants and 15 constables will leave to-morrow afternoon for Mannár by land. From Mannár they will proceed to Jaffna in boats.

The Adikar of Musali has been ordered to have a sufficient number of carts to remove all officers and their baggage to Mannár, as it has been found necessary to send all boats away to Mannár, owing to the strong wind from the south-west.

The wind has been blowing in strong from the south-west since the 3rd. On the nights of the 3rd and 4th it was blowing a perfect gale. Last night there was a lull for a short time, and the wind afterwards blew light from the land for a few hours during the night.

To-day it has been blowing again from south-west. Fishing would have been impossible after the 30th.

8th May, 1881 (*Sunday*).

Jaffna police left for Jaffna at 3 P.M. Received telegram from Captain Donnan from Colombo, informing me that he transhipped all hands from the *Geraldine* at Tuticorin to a steamer which reached Colombo this morning.

Also received telegrams from Maniagar of Jaffna, the Pearl Fishery Shroff.

Wind strong from south-west all day. Lightning over the land in the evening.

At the request of some of the traders, consented to allow the Telegraph and Post Office establishment to remain here till the afternoon of the 12th.

COPIES.

(1.)	From Colombo	To Silávatturai.
	From Donnan	To Government Agent.

Arrived this morning—all well. Caught steamer at Tuticorin and transhipped all hands.

(2.)	From Colombo	To Silávatturai.
	From Maniagar	To Government Agent.

Just arrived by steamer *Rajputana* from Tuticorin. Two counters, several constables, got sea-sick.

"True copies."

W. C. TWYNAM,
Government Agent.

Silávatturai, *9th May*, 1881.

Accounts all closed. Place now nearly deserted—all oysters washed. Carts being in readiness, all establishments except Post and Telegraph will leave to-night or to-morrow morning. Wind very strong from south-west.

In the evening, when arranging to start, some Moorish traders of Kalpattam and other places came up and earnestly begged that the Telegraph and Post Office might be kept up here till at least the 15th, as they have large remittances coming to them. Under the circumstances, I gave instructions to the postmaster to remain here till the afternoon of the 15th

W. C. TWYNAM,
Government Agent.

APPENDIX.

A.

STATEMENT of Oysters shewing the Quantity fished, Government Share, Amount realized by Government, Divers' Share, Probable Amount realized by Divers, and the Probable Total Amount realized by Government and Divers, at the Pearl Fishery of 1881.

Date	Day of Fishery.	Quantity of Oysters fished.	Government Share.	Rates sold.	Amount realized.	Divers' Share.	Probable Rates sold at.	Probable Amount realized by Divers.	Probable Total realized by Government and Divers.
1881.				Rs.	Rs.		Rs.	Rs.	Rs.
March 4	1	482017	321345	22, 23 and 25	7186	160672	60 to 20	5784	12970
5	2	480645	320430	25, 26 and 27	8059	160215	22 to 18	3204	11263
6	3	438651	292434	26, 27 and 28	7798	146217	26 to 25	3729	11527
7	4	407677	271785	29 and 30	7928	135892	28 to 27	3737	11665
8	5	663394	442263	25 and 26	11129	221131	30 to 26	6118	17247
9	6	621228	414152	24, 25, 26 and 27	10257	207076	30 to 23	5467	15724
10	7	523335	348890	30 and 31	10487	174445	31 to 26	4884	15371
11	8	951420	634280	31 and 32	19687	317140	30 to 27	9038	28725
12	9	777600	518400	27, 28, 29 and 30	14341	259200	30 to 26	7193	21534
14	10	1353900	902600	26 and 27	24038	451300	27 to 25	11734	35772
15	11	1408320	938880	25 and 26	23487	469440	23 to 21	10328	33815
16	12	1116469	744313	25, 26 and 27	19309	372156	27 to 24	9552	28861
17	13	1173645	782430	29 and 30	22951	391215	26 to 22	9520	32471
18	14	1118784	745856	35, 36, 37, 39, 40, 41, 42, 43, 44, and 45	28887	372928	45 to 35	14395	43282
21	15	1242075	828050	35 and 36	29108	414025	37 to 35	14905	44013
22	16	678262	452175	37 and 38	17006	226087	37 to 33	7913	24919
23	17	913590	609060	37, 38, 39, 40 and 41	23133	304530	38 to 36	11268	34401
24	18	987082	658055	29 and 30.	19399	329027	38 to 36	12174	31573
25	19	810937	540625	25	13516	270312	25 to 22	6352	19868
26	20	855445	570297	26, 27, 29 and 30	15689	285148	25 to 20	6444	22133
28	21	751155	500770	42, 43 and 44	21578	250385	48 to 40	11267	32845
29	22	639217	426145	36, 37, 38, 39 and 40	15636	213072	45 to 38	8736	24372
30	23	792060	528040	32, 33, 34 and 39	17361	264020	30 to 22	6953	24314
31	24	585960	390640	35, 36, 37 and 38	14192	195320	45 to 40	8301	22493
April 1	25	605280	403520	43, 44 and 45	17619	201760	45 to 43	8877	26496
2	26	795442	530295	44, 45 and 46	23559	265147	48 to 45	12374	35933
4	27	564818	376545	40, 41, 42 and 43	15468	188273	46 to 45	8566	24034
5	28	770670	513780	33, 34 and 35	17120	256890	40 to 27	8477	25597
6	29	491978	327985	34 and 35	11293	163993	34 to 30	5289	16582
7	30	481335	320890	37 and 38	11899	160445	38 to 37	6017	17916
8	31	382418	254945	40, 41, 42 and 44	10361	127473	38 to 36	4716	15077
9	32	446108	297405	41, 42, 43, 44, 47 and 48	12430	148703	40	5948	18378
11	33	6915	4610	50	230	2305	60	138	368
12	34	64997	43331	52, 53, 54, 55, 56, 57, 58, 59, 60 and 62	2352	21666	85 to 80	1787	4139
13	35	127095	84730	45, 46, 47 and 48	3908	42365	55 to 50	2203	6111
14	36	438278	292185	28, 29 and 33	8192	146093	32 to 30	4529	12721
15	37	147060	98040	34, 35 and 36	3431	49020	32 to 30	1520	4951
16	38	240180	160120	39 and 40	6268	80060	36 to 25	2562	8830
18	39	243158	162105	41, 42 and 43	6832	81053	40 to 36	3080	9912
19	40	317655	211770	40 and 41	8513	105885	45 to 40	4447	12960
20	41	345030	230020	41, 42 and 43	9474	115010	40 to 35	4255	13729
21	42	295650	197100	37, 39 and 40	7592	98550	42	4139	11731
22	43	228045	152030	35 and 36	5367	76015	45 to 40	3231	8598
23	44	142020	94680	30 and 35	2965	47340	45 to 40	2012	4977
25	45	191040	127360	38, 39, 40 and 42	4880	63680	45 to 40	2706	7586
26	46	45473	30315	43	1304	15158	40	606	1910
27	47	195083	130055	40, 45, 46 and 47	5469	65028	40	2601	8070
		27338596	18225731		598688	9112865		299076	897764

B.

PORT OF SILÁVATTURAI.

Import Coastwise into Silávatturai during 1881.

Articles imported.		Quantity.				Value. Rs	cts.
Arrack	.	gallons		1,918	...	5,402	0
Arrecanuts	...	bags		250	...	2,154	50
Bags, Baskets and Mats	...	bundles		1,082	..	2,297	0
Beverage of kinds	..	cases 24, barrels		10	..	733	0
Betel leaves	...	bundles		89	...	407	50
Beaten rice	...	bushels		9	...	23	0
Boxes and Trunks	...	No.		68	...	487	0
Coffee	...	cwt.	3 1 0		...	162	50
Cadjans	...	bundles		12,274	...	444	75
Chillies	...	cwt.	30 0 0		...	884	0

B.—*continued*

Articles imported.		Quantity.			Value. Rs.	cts.
Cocoanuts	..	No.	78,145	...	2,039	0
Coir rope and yarn	...	bundles	57	...	233	50
Cotton Goods	...	bundles 154, cases	15	...	59,670	0
Crockery and Glassware	...	cases 10, bundles and crate	16	...	407	0
Curry stuffs	...	cwt. 177 3 0		...	1,968	75
Earthen and stoneware	...	pieces	6,566	...	298	75
Fish dried and salted	...	cwt. 48 0 14		...	347	50
Fruits	..	bunches	5,733	...	1,675	50
Gunnies	...	bundles	74	...	403	0
Grain, Rice	...	bushels	5,105	...	12,960	0
Gram	...	,,	81	...	228	50
All other Grain	...	,,	16	...	51	0
Jaggery	...	basket 1, bags 2, cwt. 10 2 0		...	75	0
Jewellery	...	bundles 4, parcels 14, cases 36		...	8,630	0
Live stock, sheep and goats	..	No.	210	...	560	0
Metals, brassware	...	bdls. 14, pieces 13, cwt. 8 0 0		...	1,882	0
All other metals	...	cwt. 14 1 20		...	225	0
Oils of kinds	...	gallons	1,364	...	2,580	50
Onions	..	bags	36	...	121	0
Potatoes and yams	...	bags 94, cwt. 33 3 8, &	10,000	...	272	10
Sugar	...	cwt. 33 0 0		...	763	50
Sugar candy	..	,, 7 2 16		...	207	50
Tobacco	...	,, 43 0 2		...	1,095	0
Cigars	...	cases	12	...	1,297	0
Tar	...	barrels	30	..	450	0
Vegetable and Garden produce		No. 15,330, bags	135	...	336	0
Woods of sorts	..	,, 120, pieces	129	...	305	0
Merchandize and all other Imports	...	cases 92, bundles 472, tons 10		...	8,111	25
				Rs.	120,188	60

Number of Vessels engaged in this trade ... 346
Tons 2,883

Imported beyond Sea into Silávatturai during 1881.

Articles imported.		Quantity.			Value Rs.	cts.
Arrecanuts	...	bag	1	...	10	0
Bags, Baskets and Mats	...	bundles	169	...	111	50
Betel leaves	...	,,	2	...	2	0
Beaten rice	...	bushels	392	...	573	84
Boxes and Trunks	...	No.	124	...	324	0
Cadjans	...	bundles	68	..	15	50
Chillies	...	cwt. 13 2 0		...	91	58
Coir rope, Yarn	...	bundles	15	...	33	25
Cotton goods	...	bundles 21, cases	5	...	5,263	27
Crockery and Glassware	...	pieces	1,395	...	61	25
Curry stuffs	...	cwt. 100 3 0		...	381	39
Earthen and stoneware	..	pieces	14,896	...	384	70
Fruits	...	bundles	3	...	19	60
Gunnies	...	,,	21	..	72	0
Grain, Rice	..	Bushels	9,455	.	23,736	0
Gram	...	,,	181	...	759	0
All other Grain	...	,,	200	...	496	0
Jaggery	...	cwt. 14 2 14		...	63	0
Jewellery	...	bundles 5, case	1	..	5,913	0
Live stock, Sheep and Goats	...	No.	2,595	..	7,205	50
Metal, Brassware	...	cwt. 8 0 0		...	571	50
All other Metals	...	,, 12 2 0		...	83	0
Oils of kinds	...	Gallons	32	..	68	0
Onions	...	cwt. 22 3 0		...	829	0
Potatoes and Yams	...	,, 31 2 25		...	85	48
Sugar	..	,, 12 2 0		..	480	0
Sugar Candy	..	,, 0 2 14		...	28	0
Tobacco	...	,, 1 3 3		..	45	0
Cigar		cases 2, bundle	1	...	310	0
Vegetable and Garden produce		No.	75	...	2	0
Woods of sorts	..	,,	4	...	16	0
Merchandize and all other Imports	...	cases 10, bundles	22	..	77,106	30
				Rs.	125,140	66

Number of Vessels engaged in this trade - 243
Tons 3,110

CUSTOMS REVENUE.

Customs	..	..	Rs. 3,652	84
Port Dues	...	...	353	56
			Rs 4,006	40

PEARL FISHERY. 1881.

APPENDIX,

Export Coastwise from Silávatturai during 1881.

Articles exported		Quantity.		Value. Rs	cts.
Arrack	...	gallons	503	... 1,609	0
Arrecanuts	...	cwt. 45 2 0		... 456	0
Bags, baskets and mats	...	bundles	2,225	... 548	0
Beverage of kinds	...	cases	5	... 120	0
Beaten rice	...	bushels	27	... 60	0
Coffee	...	cwt. 1 2 0		... 15	0
Cocoanut	...	No.	5,175	... 155	75
Cotton Goods	...	bundles	45	... 1,824	0
Curry stuffs	...	cwt. 132 2 0		... 1,392	0
Earthen and stoneware	...	pieces	2,751	.. 140	0
Furniture	...	No.	21	... 66	0
Fish, dried and salted	...	cwt. 45 2 0		... 456	0
Ghee	...	gallons	26	... 92	0
Gunnies	...	bundles	15	... 69	0
Grain, paddy	...	bushels	104	... 132	0
Oysters	...	No.	908,500	... 27,255	0
				Rs 34,389	75

Number of Vessels engaged in this trade 433
Tons 2507

Export beyond Sea from Silávatturai during 1881.

Articles exported.		Quantity.		Value. Rs.	Cts.
Cocoanuts	..	No.	10,500	.. 315	0
Cotton Goods	..	bales	3	... 600	0
Fish, Dried and Salted	...	cwt. 4 0 0		... 80	0
Gunnies	...	bundles	3	... 15	0
Grain of sorts	...	bushels	25	... 62	50
Oysters	...	No.	35,000	... 1,096	0
Woods of sorts	...	,,	400	... 400	0
All other Exports	...	bundles	89	... 232	50
				Rs. 2801	0

Number of Vessels engaged in this trade 230
Tons 2,694

C.

STATEMENT of the Number of Diseases and Deaths in the Small-pox and General Hospitals, and Out-door Dispensary at Silávatturai, during February, March and April, 1881.

Description.		Number treated.	Number of Deaths.	Remarks.
Small-pox Hospital		1	—	This case was admitted and discharged, before the Fishery commenced, from the Inspection vessel.
General Hospital	February...	6	—	The diseases treated at the General hospital have been for the most part ague, general dropsy, dysentery, and diarrhœa
	March ...	27	4	
	April ...	33	4	
Out-door Dispensary	February. .	51	—	Fever, due to the influence of malaria, has been most numerous at the out-door dispensary; ear-ache and bleeding from the ear have been a frequent complaint among the divers.
	March ...	131	—	
	April	122	—	

D.

STATEMENT of Salt and Arrack sold at Silávatturai on account of the Pearl Fishery in 1881.

1881.		Salt, cwts.		Arrack, gallons.
February	...	30	...	170
March	...	141	...	795
April	...	130	...	740
	Total ...	301	...	1,705

B.

ACCOUNT PARTICULARS of Government Share of Pearl Oysters fished and sold during the Pearl Fishery of 1881.

No. of Oysters.		Rate per 1,000. Rs.		Amount realized. Rs.	cts.	TOTAL. Rs.	cts.
217,000	...	22	...	4,774	0		
98,345	..	23	...	2,262	0		
130,000	...	24	...	3,120	0		
2,491,935	...	25	...	62,299	0		
1,422,015	...	26	...	36,973	0		
1,045,313	...	27	...	28,223	0		
571,834	...	28	...	16,011	0		
1,399,567	...	29	...	40,588	0		
1,031,680	...	30	...	30,950	0		
629,890	...	31	...	19,527	0		
157,280	...	32	...	5,033	0		
702,185	...	33	...	23,172	0		
388,820	...	34	...	13,220	0		
1,264,105	..	35	...	44,243	0		
581,076	...	36	...	20,919	0		
1,046,305	...	37	...	38,713	0		
974,065	...	38	..	37,015	0		
413,120	...	39	...	16,112	0		
764,415	...	40	...	30,576	0		
611,685	...	41	...	25,080	0		
422,000	...	42	...	17,724	0		
846,130	...	43	...	36,384	0		
547,295	...	44	...	24,081	0		
334,730	...	45	...	15,063	0		
48,000	...	46	...	2,208	0		
36,000	...	47	..	1,692	0		
3,000	...	48	...	144	0		
4,610	...	50	...	230	0		
5,331	...	52	...	277	0		
14,000	...	53	...	742	0		
13,000	...	54	...	702	0		
1,000	...	55	...	55	0		
5,000	...	56	...	280	0		
1,000	...	57	...	57	0		
1,000	...	58	...	58	0		
1,000	...	59	...	59	0		
1,000	...	60	...	60	0		
1,000	...	62	...	62	0		
18,225,731	...		...			598,688	0
Proceeds sale of sample pearls of November, 1880				380	0		
Do. do. February, 1881				365	0		
Do sweepings of the Government kottú				100	0		
						845	0
				Total ... Rs.		599,533	0

F.

AN ACCOUNT shewing the Number of Diving Boats and Divers that have daily arrived at the Port of Silávatturai from each Port during the Pearl Fishery of 1881.

Explanation:—*B* stands for "Boat"—*D* for "Divers and Manducks."

1881.	From Jaffna.		From Mannar.		From Kalpitiya.		From Kilikarai		From Tondy.		From Paumben		From Negapatam		From Tuticorin.		From Ammapatam.		From Adirampatam.		From Kailpatam		From Terumullaivasal.		From Nagore.		From Devipatam		From Topoturai.		General Total.	
	B	D.	B.	D.	B	D.	B.	D	B.	D.	B	D.	B.	D	B	D.	B	D	B.	D.	B	D.	B.	D.	B.	D.	B.	D.	B	D.	B.	D.
February 16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	20
21	—	—	—	—	2	—	—	—	—	—	—	—	1	—	5	57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	57
22	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	4	—
23	3	—	—	—	—	—	1	12	1	—	1	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	12
24	1	—	—	—	1	—	3	49	—	—	8	107	1	—	—	—	—	—	—	—	1	19	—	—	—	—	—	—	1	—	16	175
25	1	—	—	—	1	—	—	—	—	—	1	12	—	—	1	15	—	—	—	—	1	11	—	—	—	—	—	—	2	—	7	38
26	2	—	—	—	—	—	8	105	—	—	—	—	1	21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	126
27	4	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—
28	10	—	—	—	2	—	36	680	—	—	3	26	1	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	52	706
March 1	4	—	3	—	—	—	14	257	3	35	2	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	19	—	—	28	311
2	11	—	—	—	—	—	8	145	3	54	2	12	—	—	—	—	—	—	—	—	—	—	1	—	—	—	1	—	—	—	26	211
3	8	—	—	—	—	—	12	239	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	2	26	1	5	24	270
4	—	—	—	—	—	—	1	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	4	12
5	2	—	—	—	—	—	—	—	—	—	—	—	1	—	3	53	—	—	1	—	—	—	—	—	—	—	—	—	1	—	8	53
7	—	—	—	—	—	—	—	—	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	2
10	—	—	—	—	—	—	—	—	7	75	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	75
	46	—	3	—	6	—	83	1499	15	166	18	157	11	21	14	145	—	—	2	—	2	30	3	—	1	—	4	45	8	5	216	2068

N.B.—Boats employed in Diving, 213; boats unemployed, 3 (of Jaffna).

F 2.

MEMORANDUM of the Number of Diving Boats employed in the Fishery of 1881, shewing the Ports to which they belong and distinguishing the colour of their flag.

	Blue.	Red.
Jaffna	29	17
Mannar	2	1
Kalpitiya	3	0
Kilakarai	30	53
Tondi	8	7
Paumben	9	9
Negapatam	9	2
Tuticorin	2	12
Ammapatam	0	0
Adrampatam	2	0

	Red.	Blue.
Kailpatam	2	0
Teromullavasel	2	1
Nagore	1	0
Devipatam	3	1
Kopalapatam	0	0
Topoturai	5	3
Total	107	106

G.

PEARL FISHERY.

NOTICE is hereby given that a Pearl Fishery will take place at Silávatturai in the Island of Ceylon, on or about the 20th of February, 1881, and that the bank to be fished is the North-West Cheval, estimated to contain oysters sufficient to employ 100 boats for thirty days, with average loads of 10,000 oysters each per day.

It is therefore recommended that such boat-owners and divers as may wish to be employed at the said fishery should be at Silávatturai on or before the 15th February next, and it is notified that the first day's fishery will take place on or about the 20th of February, weather permitting.

The fishery will be conducted on account of Government, and the oysters put up to sale in such lots as may be deemed expedient.

The arrangements of the fishery will be the same as have been usual on similar occasions

All payments to be made in ready money in Ceylon currency.

Drafts on the Banks in Colombo or Bills on the Agents of this Government in India at ten days' sight will be taken, on letters of credit being produced to warrant the drawing of such drafts or bills.

For the convenience of purchasers the Treasurer at Colombo, and the different Government Agents of Provinces will be authorized to receive cash deposits from parties intending to become purchasers, and receipts of these officers will be taken in payment of any sums due on account of the fishery.

No deposit will be received for a less sum than five hundred rupees.

By His Excellency's Command,

Colonial Secretary's Office,
Colombo, 9th December, 1880.

J. DOUGLAS,
Colonial Secretary.

STATEMENT of the Valuation and Produce of 16,200 Oysters taken from the N.W. Cheval in November, 1880.

No	Description.	Size in basket.	Number.	Quantity in Chevoe.	Kalangey.	Manjady.	Total. Kalangey.	Total. Manjady.	Value.	Total Value.	Per Chevoe.	Per Kalangey.
									R. cts.	Rs. cts		
1	Peesel ...	20	4	—	—	1 1/2	—	—	0 39	—	—	1½ Star Pagodas
2	Kodai ...	-	7	—	—	3	—	4 1/2	0 52½	0 91½	—	1 do.
3	Anatharey .	30	3	1/4	—	1	—	—	8 75	—	10 Star Pagodas	
4	Kalippu ..	—	4	70/320	—	1 2 16	—	2 2/16	3 82½	12 57½	5 do.	
5	Anie ...	50	2	16/320	—	6/16	—	—	3 50	—	20 do.	
6	Anatharey ...	—	3	27/320	—	10/16	—	—	3 54	—	12 do.	
7	Kalippu ..	—	11	—	—	2 10/16	—	—	9 19	—	—	20 do.
8	Koroval ..	—	12	—	—	3 6/16	—	—	8 27	—	—	14 do.
9	Peesel ...	—	17	—	—	4 1/4	—	—	2 97½	—	—	4 do.
10	Kodai ..	—	5	—	—	1 1/4	—	12 1/2	0 5	27 52½		
11	Anie ..	80	6	45/320	—	1 1/16	—	—	11 31	—	23 do.	
12	Anatharey	—	5	27/320	—	3/4	—	—	3 54	—	12 do	
13	Kalippu ..	—	12	—	—	1 11/16	—	—	4 72	—	—	16 do.
14	Koroval ..	—	12	—	—	1 3/4	—	—	3 6	—	—	10 do.
15	Peesel ..	—	9	—	—	1 10/16	—	—	0 85½	—	—	3 do.
16	Kodai ..	—	5	—	—	3/4	—	7 10/16	0 5	23 54		
17	Vadivoe	100	—	2 197/320	1	8 3/4						
18	excluding	200	—	1 134/320	1	8 6/16	4	8 10/16	210 50	210 50	15 do.	
19	Madunku	400	—	312/320	1	11 1/2						
				4 3/320								
20	Tool	600	—	—	5	7	5	7	56 17½	56 17½	—	3 do.
21		800										
22		1000										
23	Marsietool ..	—	—	—	2	13 1/2	2	13 1/2	14 4	14 4	—	1½ do.
24	Shell Pearls	—	—	—	--	12 1/2	—	12 1/2	1 0	1 0		
						Total...	14	8 6/16		346 27		

JAMES DONNAN, Inspector of Pearl Bank,
M. SEEMANPILLAI, Mudaliyár, Adigar of Musalai, &c.
(S. I. S. MARKAIR KABEBO MOHOMEDOE.) } Pearl Merchants.

Silávatturai, 29th November, 1880.

H.

STATEMENT of the Valuation and Produce of 15,200 Oysters taken from the North-West Cheval in February, 1881.

No.	Description.	Size in basket	Number.	Quantity in Chevoe.	Kalangy.	Manjady.	Total. Kalangy.	Total. Mangady.	Value.	Total Value.	Per Chevoe.	Per Kalangy.
									Rs. cts	Rs. cts.		
1	Peesal ...	20	5			1¼			0 65		—	3 Star Pagodas
2	Karoval ..	—	4			2½			4 37½		—	10 do.
3	Kalippu ..	—	1	60-320ths		½	—	4¼	3 94	8 96½	6 Star Pagodas	
4	Peesal ..	30	6			1½			0 53		—	2 do.
5	Karoval ..	—	5			1 10-16ths			2 27½		—	8 do.
6	Kalippu ...	—	5	128-320ths		1 10-16ths	—	4¾	14 0	15 80½	10 do.	
7	Peesal ...	50	5			1½			0 39		—	1½ do.
8	Karoval ...	—	9			3			3 15		—	6 do.
9	Anothary ...	—	12	180-320ths		3¾			19 69		10 do.	
10	Anie .	—	1	12-320ths		¼	—	8½	2 10	25 33	16 do	
11	Peesal .	80	16			3¼			1 14		—	2 do.
12	Koroval ..	—	15			3			3 15		—	6 do.
13	Anothary .	—	14	80-320ths		2½	—	8¾	10 50	14 79	12 do.	
14	Vadivo excluding Madango	100	—	2 165-320ths	1	8¾						
15		200	—	1 280 320ths	1	17½	4	18¾	211 92½	211 92½	14 do.	
16		400	—	15-320ths	1	12½						
17	Tool	600	—									
18		800	—	5 130 320ths	4	11¼	4	11¼	39 94	39 94	—	2½ do.
19		1000	—									
20	Marsoe Tool ...				2	2½	2	2½	11 15	11 15	—	1½ do.
21	Shell Pearls ...			—		1¼	—	1¼	2 57½	2 57½		
							13	—		331 48		

I.

STATEMENT of Oysters exported during the Pearl Fishery of 1881.

Name of Place.		Number of Oysters
Colombo	...	856,000
Galle	...	4,000
Negombo	...	1,700
Jaffna	...	23,375
Kalpitiya	...	8,925
Mannar	...	16,500
Nagore	...	10,000
Negapatam	..	15,000
Tuticorin	...	7,500
	Total ...	943,000

J.

AVERAGE Rates at which Pearls were purchased by Traders at different stages of the Fishery.

March 10th	...	Rs. 49 or 14 Star Pagodas per kalangy.		
20th	...	Rs. 42 or 12	do.	do.
30th	...	Rs. 56 or 16	do.	do.
April 10th	...	Rs. 49 or 14	do.	do.
20th	...	Rs. 42 or 12	do.	do.
30th	...	Rs. 28 or 8	do	do.

W. C. TWYNAM,
Government Agent.

XII.—1881.

GRAIN TAX COMMUTATION.

REPORT

ON THE

COMMUTATION SETTLEMENT OF THE KURUWITI KŌRALĒ, SABARAGAMUWA DISTRICT.

UNDER THE PROVISIONS OF

THE GRAIN TAX ORDINANCE, 1878.

(In continuation of Sessional Paper No. III. of 1881.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

REPORT ON THE GRAIN TAX COMMUTATION

FOR THE

KURUWIṬI KÓRALE OF THE SABARAGAMUWA DISTRICT.

THE Grain Tax Ordinance was introduced into the Kuruwiṭi-kóralé of Sabaragamuwa on the 1st March, 1881, by the Proclamation dated 2nd November, 1880.

2. It was considered necessary, before such introduction, to cancel the agreements existing between landowners and the Government Agent in respect of payment of grain-tax, and for this purpose the Grain Commissioner appointed for the kóralé was also appointed Additional Assistant to the Government Agent.

3. The double duty, so imposed, was carried out as follows :—A day was fixed as usual for the election by landowners, under the 7th clause of the Ordinance, of a mode of payment. Upon that day the main provisions of the Ordinance having been explained to those who were present, and a way of payment having been chosen by them, the register of present agreements was read over ; each land-owner who had signed the register re-signed it in cancellation of his contract ; and, as he did so, the amount payable under the new settlement was communicated to him. Such amounts being necessarily less than those due under the old settlement, no difficulty was experienced in effecting transactions.

4. The tax upon lands not affected by the old settlement was commuted in the usual way, and invariably for annual payments, crop-commutation being regarded with no more favour here than it has been elsewhere.

5. The district price of paddy was determined to be, for annual commutation, the average of the prices at which the people had commuted optionally during the last fourteen years ; and for crop-commutation, the price which they had, in like way, accepted during the last seven years.

6. The results of the work will be found in the appendix, in the preparation of which the tables of Dry Measure and Land Measure, which I sent in with my report upon the Uḍugaha-pattuwa of the Siyaṇé-kóralé, have been used. The Kandyan "laha" measure and that used in the maritime districts do not, as far as I can see, differ in capacity

7. The other divisions of Sabaragamuwa have recently been brought within the operation of the Ordinance ; and the general observations I have to make in respect of paddy cultivation in this kóralé I would prefer to include in the report which I shall furnish after the completion of my work in the District.

A. R. DAWSON,
Grain Commissioner.

Peḷmaḍulla, 1st June, 1881.

APPENDIX.

1.	Number of villages containing paddy fields and ówiti lands ...	84		
2.	Number of parcels of such lands	13,652		
		A	R.	P.
3.	Extent, one-fourteenth of the produce of which is payable to the Government	6,251	1	0
	Do. one-fifth do. do. do. ...	1	2	0
		Rs	cts.	
4.	Amount found payable as annual commutation	7,101	80	
5.	Rate per acre payable as annual commutation	1	13	
6.	Average revenue derived annually during the last fourteen years from commuted and from uncommuted taxes on paddy, the produce of fields and ówiṭi lands in this kóralé	7,143	13	

A. R. DAWSON,
Grain Commissioner.

XIII.—1881.

REPORT

OF THE

NEW PRODUCTS COMMISSION:

APPOINTED TO REPORT ON

THE QUESTION OF THE INTRODUCTION AND CULTIVATION OF NEW CULTURES IN CEYLON.

Ordered by His Excellency the Lieutenant-Governor to be Printed.

COLOMBO:

GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

NEW PRODUCTS COMMISSION.

LETTER OF APPOINTMENT.

NEW PRODUCTS COMMISSION.

LETTER OF APPOINTMENT.

The Hon. the COLONIAL SECRETARY to the Hon. W. H. RAVENSCROFT.

Colonial Secretary's Office,
Colombo, 12th April, 1881.

SIR,—I AM directed to transmit to you the enclosed Commission appointing yourself, Mr. Downall, Dr. Trimen, and Mr. G. Wall, to be a Commission for making the enquiry referred to in the Commission.

A copy of a Despatch received from the Secretary of State on the subject is also enclosed.*

I am, &c.,
J. A. SWETTENHAM,
for Colonial Secretary.

COMMISSION.

COMMISSION.

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith.

By His Excellency the Hon. JOHN DOUGLAS, Companion of the Most Distinguished Order of Saint Michael and Saint George, Lieutenant-Governor in and over the Island of Ceylon, with the Dependencies thereof.

J. DOUGLAS.

To the Honourable WILLIAM HENRY RAVENSCROFT, Acting Colonial Secretary and Member of the Executive Council; the Honourable REGINALD BEAUCHAMP DOWNALL, Member of the Legislative Council; Dr. HENRY TRIMEN, Director of the Royal Botanic Gardens, Péradeniya; and GEORGE WALL, Esq., Chairman of the Ceylon Planters' Association:

GREETING.

WHEREAS we have deemed it expedient that a Commission should issue to enquire into the proposal made by Sir Joseph Hooker, Director of the Royal Gardens, Kew, to assist the Planters in Ceylon in developing new industries and to report what new staples are likely to be efficiently taken up, and the probable annual supply of seeds and plants that will, for the present, be needed to develop them:

Now Know ye that We, reposing great trust and confidence in your ability and discretion, have nominated, constituted, and appointed, and by these Presents do nominate, constitute, and appoint you, the said WILLIAM HENRY RAVENSCROFT, REGINALD BEAUCHAMP DOWNALL, HENRY TRIMEN, and GEORGE WALL, to be Our Commissioners for the purposes of the said enquiry.

And for the purpose of enabling you, Our Commissioners, to make the said enquiry, We do hereby authorize and empower you to exercise the power given to Commissioners by the Ordinance No. 9 of 1872, entitled "An Ordinance to empower Commissioners appointed by the Governor to enquire into any matter referred to them for enquiry to hear evidence thereon," in conformity with the provisions thereof.

Given at Nuwara Eliya, this Ninth day of April, in the year of our Lord One thousand Eight hundred and Eighty-one.

By His Excellency's command,
W. H. RAVENSCROFT,
Acting Colonial Secretary.

* *Vide* Sessional Paper IV. of 1881.

NEW PRODUCTS COMMISSION.

PROCEEDINGS.

PROCEEDINGS.

Saturday, 11th June, 1881.

PRESENT:

The Hon. W. H. RAVENSCROFT, Acting Colonial Secretary, in the Chair.
Dr. TRIMEN, Director, Royal Botanic Gardens.
G. WALL, Esq.

Read letter appointing the Commission.

Read Sessional Paper No. IV. of 1881.

Read Despatch No. 142 of 25th April, 1881, from the Secretary of State to the Officer Administering the Government of Ceylon, and its enclosure letter of 14th April, 1881, from the Director of the Royal Botanical Gardens, Kew, on the subject of the introduction of new products.

Read letter from the Planters' Association dated 14th May, 1881, to the Colonial Secretary, on the subject of new products.

Certain resolutions were put forward, which were partially discussed, and left over for final determination at the next meeting.

Monday, 11th July, 1881.

PRESENT:

The Hon. W. H. RAVENSCROFT, in the Chair.

The Hon. R. B. DOWNALL.
Dr. TRIMEN.
G. WALL, Esq.

Re-considered certain resolutions proposed at the last meeting.

Read Memorandum prepared by Dr. Trimen relative to the introduction of economic products into Ceylon.

Agreed to report.

PAPERS LAID BEFORE COMMISSION.

PAPERS LAID BEFORE THE COMMISSION.

No. 1.

The Hon. the COLONIAL SECRETARY to the CHAIRMAN of the Commission on New Products.

Colonial Secretary's Office,
Colombo, 2nd June, 1881.

SIR,—I AM directed to transmit to you the enclosed copy of a despatch received from the Secretary of State.

I am, &c.,
J. A. SWETTENHAM,
for Colonial Secretary.

Enclosure in No. 1.

The EARL OF KIMBERLEY to the OFFICER ADMINISTERING THE GOVERNMENT OF CEYLON.

Ceylon.—No. 142. Downing-street, 28th April, 1881.

SIR,—WITH reference to my despatch No. 32 of the 2nd of February last, forwarding a letter from Kew Gardens regarding the planting industries of Ceylon, I have the honor to transmit to you a copy of another letter which has been received from Sir Joseph Hooker. You will see that Sir J. Hooker wishes to explain what it is in the power of the authorities of Kew Gardens to do in the way of rendering help to the introduction of new plants into Ceylon, as he has been obliged to refuse very many applications for assistance.

Sir J. Hooker further makes a suggestion, which seems worthy of your consideration, that the Commission, which was recommended in my despatch of the 2nd of February, might perhaps think it worth while to attempt the direct importation of the seed of the Para and Ceara rubbers.

I have, &c.,
KIMBERLEY.

NEW PRODUCTS COMMISSION.

PAPERS LAID BEFORE.

Sub-Enclosure in Enclosure in No. 1.

Mr. THISELTON DYER to the COLONIAL OFFICE.

Royal Gardens, Kew,
14th April, 1881.

SIR,—ON January 12th last I addressed to you, at the desire of Sir Joseph Hooker, a letter offering some suggestions made with the object of encouraging new planting industries in Ceylon. Sir Joseph Hooker was glad to learn from Mr. Herbert, in a letter dated February 3rd, that these suggestions met with the approval of the Secretary of State, and had been communicated to the Ceylon Government.

Since this time, applications have continued to pour in from Ceylon at the rate of two or three a week (many coming through private channels in this country), to say nothing of personal interviews, for the purpose of obtaining from this establishment seeds and plants, in large quantity, of new staples.

It is impossible not to feel regret at the manifest disappointment caused by the unavoidable refusal with which each successive case has been necessarily met. I venture to trouble you with the following remarks, for the purpose of defining our position in a matter of this kind, and with the hope that they may be transmitted to Ceylon, so as to obviate the misconception which seems to exist there as to what it is in our power to do.

The most pressing demand is for seed of Para and Ceara India rubber, of which planters in Ceylon do not hesitate to write to ask us to send them "bushels." Now you are aware that the introduction of these valuable plants into the Island is entirely due to the munificence of the Indian Government, which went to immense expense in procuring them from the New World. *Vide* foot-note in appendix, p. 9. There being no tropical Botanic Garden suited for their reception in India, it was at Sir Joseph Hooker's suggestion that Ceylon was made the depôt for the young plants in the East. The Island has therefore participated the benefit of their introduction, without in any way sharing the enormous expense.

Practically, the whole stock of Para India rubber plants—some 2,000 in number—which has ever been in the possession of the Royal Gardens, has been transmitted to Ceylon. Having successfully effected the introduction of the species into the East Indies, it is not within our means to take any further step in the matter. The collection of the seed is costly and difficult, and our experience is that, even when freshly brought to this country, scarcely more than three per cent. has germinated.

With regard to the Ceara rubber, a reference to the Kew reports for 1876 and 1877 will show that the whole stock of plants with which we had originally to work was only 55, all told.

Those sent to Ceylon have succeeded remarkably well; they have fruited profusely, and Dr. Trimen appears to have distributed every seed in his possession. With the successful introduction of this species into the East, we consider our duty in the matter closed.

Plants of the Para rubber were sent out from Kew in 1876, and of the Ceara rubber in 1877. The introduction is a very recent one; it appears from Dr. Trimen's memorandum on the subject (Sessional Papers, 1880, No. VII.), that both plants can be propagated with facility from cuttings.* With reasonable assiduity there can be no doubt that planters who take up the new cultivation might raise large stocks in a very short time.

I need not refer to the other plants, for the seeds of which we have been asked. I think it must be evident that the function of this establishment must be limited, as regards the Colonies, to the communication to their respective Botanic Gardens of such new and important plants as we are able to distribute. The Colonial Botanic Gardens will, in their turn, propagate and distribute the plants received from us. But even this operation cannot be performed in a wholesale way. The development of new cultures requires time. And if, when the suitability of climate and soil to some new staple has been established through our instrumentality, planters are at once impatient to embark on its cultivation on a large scale, they must not look to this establishment, nor indeed to the local Botanic Garden, for aid in carrying out undertakings of a magnitude which makes them matters of purely commercial enterprise.

The Commission, the appointment of which has been suggested, might perhaps think it worth while to attempt the direct importation of some seed of the Para and Ceara rubbers. With regard to the first, which travels so badly, the only chance of success would be by packing the seed in slightly moistened earth. The quantities in each case should not be large on account of the risk of heating. The seed of the Ceara rubber plant would probably travel better and might be transmitted in linen bags. The only chance, as far as I am aware, of aid in the matter would be through the Consul at Grand Para and the Vice-Consul at Ceara. I am sure also that the accomplished and courteous Director do Passeio publico at Rio de Janeiro, Monsieur Glaziou, would give every assistance in his power to Dr. Trimen.

I am, &c.,
W. T. THISELTON DYER.

* Which is also our experience at Kew.

NEW PRODUCTS COMMISSION.

PAPERS LAID BEFORE.

No. 2.

The Hon. the COLONIAL SECRETARY to the CHAIRMAN of the Commission on New Products.

Colonial Secretary's Office,
Colombo, 25th May, 1881.

SIR,—I AM directed to refer to you the enclosed letter from the Secretary, Planters' Association, Kandy.

I am, &c.,
J. A. SWETTENHAM,
for Colonial Secretary.

Enclosure in No. 2.

The SECRETARY, Planters' Association, to the Hon. the COLONIAL SECRETARY.

Kandy, 14th May, 1881.

SIR,—I HAVE the honor, on behalf of the Sub-Committee appointed to communicate with Government as to the best means of introducing seed and plants of such new products as offer inducements to cultivators, to ask if Government would be prepared to consider the recommendations of the Sub-Committee, after enquiry, and to forward any lists of requirements that might be made up to the sources from which supplies are most likely to be drawn.

The Sub-Committee would point out that seeds of the better varieties of cinchonas are almost unobtainable in Ceylon by private applicants, and that these might be obtained from the Indian Government plantations at Darjeeling and at Ootacamand, and also from the Dutch Government at Java. They would also beg to instance that it is equally impossible to obtain seeds of any of the species yielding India rubber, and they cannot but think Government influence could secure a supply from South America and elsewhere.

I have, &c.,
A. PHILIP,
Secretary.

REPORT

REPORT OF THE COMMISSIONERS.

THE Commissioners having duly and very carefully considered the questions referred to them for report, are of opinion that it is not the function of the Government Botanical Gardens to supply seeds and plants of new products in quantities, but that it consists in and terminates with their successful introduction and acclimatization.

The Commissioners recognize the fact that the above object has been and is now kept in view in the administration of the Botanical Establishment in Ceylon. They therefore have requested the Director of the Botanical Gardens to refer to the records of Pérádeniya Gardens, and to furnish a statement of the new economic plants or varieties that have, from time to time, been introduced into Ceylon, shewing the success of each so far as the records at his disposal and the existing plants in the Gardens afford information; and the same having been furnished, is attached hereto. (*Vide* appendix D.)

On a careful consideration of the letter addressed by the Secretary of the Planters' Association to the Colonial Secretary, under date of 14th May, 1881, the Commissioners are of opinion that great benefit would result if, having due regard to the interests of private enterprise, the organization of Government in regard to the various colonies and in foreign countries were made use of for the purpose of facilitating the purchase in those places of seeds and plants of new cultures required in Ceylon.

The Commissioners would have been glad to have had before them an outline of a scheme approved by the Sub-Committee of the Planters' Association; but, failing this, they submit for the consideration of Government the following scheme which appears to them to meet the requirements of the occasion:—

1.—That the Planters of Ceylon should form a standing committee, or should appoint some permanent body to communicate with Government, and that the Planters' Association should be communicated with and asked if it will undertake this duty.

2.—That this committee shall from time to time send in to the Colonial Secretary lists of such plants and seeds as are required, the quantity needed, and the names of the applicants, with a certificate that each application is *bonâ fide*, the seeds and plants for the personal requirements of the applicant, and not for purposes of re-sale or export.

3.—That in the case of sufficiently large demands, Government shall be prepared to ascertain whether it be possible and desirable to obtain seeds and plants in such quantities; and, if so, at what price they can be supplied to the committee.

4.—That Government shall inform the committee of the result of its enquiries, and on receipt of payment shall take steps to procure the plants and seeds desired, and forward the same to the committee for distribution.

5.—That the disposal of the plants and seeds to the applicants must be wholly managed by the committee, as also all correspondence and other communications with the individual planters.

Government cannot undertake any of the expenses in the matter. The cost therefore of freight, &c., will be taken into account in estimating the amounts to be charged to the applicants.

Neither the Royal Botanic Gardens, Pérádeniya, nor the Royal Gardens, Kew, can take any direct part in the above scheme, which should relieve them of a strain they are not constituted to bear.

Whilst admitting that the coffee interest has suffered very serious discouragement of late years, and that, in consequence, some of the older and more exhausted of the lands have been abandoned, the Commissioners would nevertheless demur to the opinion expressed in Mr. Dyer's letter of 12th January, 1881, to the effect that coffee in Ceylon has seen its best days, and also to his statement that estates of 800 acres had been left uncultivated, which the Commissioners believe to be unfounded in fact.

W. H. RAVENSCROFT.
R. BEAUCHAMP DOWNALL.
HENRY TRIMEN.
GEORGE WALL.

Colombo, 11th July, 1881.

A.

APPENDIX TO REPORT.

MEMORANDUM ON THE PART TAKEN BY THE ROYAL BOTANIC GARDENS IN THE INTRODUCTION OF USEFUL PLANTS INTO CEYLON.

THE following notes on plants of economic value introduced into the Botanic Gardens during the past 35 years have been put together at the request of the Commission They show that the introduction of foreign plants of a useful character has been kept steadily in view by the Superintendents and Directors as a part of their duty, and actively prosecuted by them, and that the public utility of this Department of the Government service has in this respect, as well as in others, been fully vindicated

In drawing up this Memorandum, I have been mainly guided by the existing contents of the Gardens, and by the (unfortunately brief and scanty) notices in the annual reports, so far as I have been able to consult them Previously to 1844, the date of Dr Gardner's arrival as Superintendent, I have no records whatever, and but very few during his short but active incumbency This, however, is less to be regretted, as it is certain that, for the previous 20 years, next to nothing was done at the Gardens, which languished under the rule of a succession of mere gardeners In the period, however, from 1817–25, when the establishment was under the care of Mr. Moon, there can be no doubt that much more activity was shown, and many valuable plants introduced I have however no present means of ascertaining these, though a list of them could perhaps be compiled from Moon's "Catalogue of Indigenous and Exotic Plants growing in Ceylon," published in English and Sinhalese at Colombo in 1824. I may remark that here, as in all similar establishments, scientific knowledge and sound utility have gone hand in hand, and a "practical" head of the Gardens has meant stagnation of enterprise and the decline of influence and ability to be of public usefulness

FOOD PLANTS

Coffee—I am not aware what, if any, share the Gardens took in the early attempts at the systematic culture of this staple (which was introduced long ago by the Dutch); but I find that in 1845, at the height of the coffee mania, Pérádeniya was largely supplying the rapidly increasing estates with plants ready for planting out at the then cheap rate of 6*s* (Rs. 3) per 1,000

Of *Liberian Coffee*, now so much grown, the first plants were received at the Gardens in 1873 from Mr. Bull. These died The same year arrived plants of the very closely allied *Cape Coast Coffee* from Kew. In 1874 Mr. Bull sent 12 more plants of Liberian coffee, and in 1875 a stock from Kew was received. The cultivation was greatly helped forward by the Director, in 1876, distributing a printed paper containing the answers obtained in Liberia to a series of questions he had sent home.

A consignment of *Mauritius coffee* was received in 1876; and in 1879, by the initiative of His Excellency the Governor, a large quantity of seed of *Jamaica coffee* was obtained, and the resulting plants distributed to applicants free of charge.

Tea—*China tea* was introduced or re-introduced to the Gardens in 1845, and *Assam tea* in 1847; but it was not till about 1860 that its cultivation began to be seriously thought of In 1865 Dr Thwaites drew up an elaborate paper of instructions for the Commission of Enquiry which was sent to India by the Planters' Association; in this year 200 lb of seed were distributed from the Gardens. The *Assam Hybrid* the kind now principally preferred, was obtained here in 1867, and seed began to be distributed in 1870

NEW PRODUCTS COMMISSION.

APPENDIX.

Cacao.—This is one of the old introductions In 1845 it was being advertised for sale at Pérádeniya at 4*s.* a dozen plants The value of this culture was frequently insisted upon by the Director, and in 1873 he printed simple instructions for its cultivation Last year a very important consignment of eleven of the most highly prized varieties from Trinidad was received, which will in due course doubtless prove of great use.

Other food-plants of value, introduced at various times to the Gardens, are the *Sago Palm*, the *Sugar Palm* of Java, *Arrowroot*, new varieties of *Tapioca* and of *Paddy* and other grains. Also many tropical fruit-trees; as the *Durian*, several varieties of *Oranges*, the *Langsat*, the *Litchee*, the *Sapodilla Plum*, the *Java Almond*, the *Brazil Nut*, the *Queensland Nut*, and the *Amoy Pumelow*.

DRUGS

Cinchona.—In nothing has the immense utility of the Botanical Establishment been shewn more completely than in the history of this cultivation. So soon as there was a probability of the successful introduction of the plant into India, the Director of Pérádeniya actively engaged in the enterprise on behalf of this Colony. Supported by the Government, he, as early as 1860, selected the present Hakgala garden as the site of a plantation, and obtained the services of an experienced gardener from home. In the same year, the first plant (a yellow bark) was received from Kew, but unfortunately dead. Seeds of grey bark from India followed in 1861, and more plants of yellow bark from Kew in good order Mr. Markham sent seeds of crown bark in the next year, 1862. In 1864 there was a large number of young plants at Hakgala, and Dr. Thwaites was urging the cultivation of Bark on the planters. Little desire was, however, shewn on their part to grow anything besides coffee, although it was determined to give the plants gratuitously, on condition only that they should be carefully cultivated. In 1865 about 180,000 were thus distributed; but in subsequent years there were fewer applications By the year 1872, however, it had become acknowledged that the enterprise would prove profitable, and the Government then fixed the sale of plants at 5 rupees per 1000. Applications were very numerous for the next six years (1873-78), culminating in 1876, when 1,224,000 plants were sent out By this time cinchona planters had mostly formed their own nurseries, and the issue from Hakgala has gradually diminished to very small quantities.

Though it is the case that the Hakgala garden has by no means kept pace in any respect with the great and expensive Indian and Java establishments, or, in the introduction of the best sorts, even with some private enterprise here, yet it must be remembered that nothing more was ever contemplated at Hakgala than fairly to start the cultivation by rapid propagation of plants for distribution to the planters, and that, as no provision was ever made there for the conduct of experiments requiring special knowledge and leisure, it was impossible that any contributions to Quinology could result from its foundation.

The fact remains that the lucrative industry of Cinchona planting was wholly the creation of the Government Botanical Department; and a course has been since successfully steered which, whilst affording very great assistance to the planters, has never attempted to enter into competition with them, nor at any time made addition to revenue to be the main object or an object of importance, as is the case in South India and Jamaica and in Java.

Ipecacuanha. This important drug was introduced here from Kew in 1856, and a further stock in 1871. From Calcutta a number of plants were obtained in 1874. A small number are annually disposed of.

Other medicinal plants brought into the colony through the Gardens, and of more or less value commercially, are:—*Calabar Bean, Cajuput, Benzoin, true Rhubarb, Camphor, Cascarilla, Coca, Sarsaparilla, Balsams of Peru and of Tolu, Cubebs, Calumba-root, Jalap, Cebadilla.*

CONDIMENTS AND SPICES.

Cardàmoms.—I am not aware when the valuable Malabar variety was first introduced, but it has probably been cultivated by the natives for a long period. Dr. Thwaites advocated its systematic culture in his report for 1868, and about 1873 it began to be taken up. The Gardens now supply large quantities.

Nutmeg—This dates further back than the existence of the Gardens, but it is included in the sale list for 1845—the seeds offered at 2*s.* a dozen, and plants at 12*s* a dozen. Within the last two years there has been a revived demand for this; and as the Gardens possess a number of trees in full bearing, large orders can be met During this year and the last, between 14,000 and 15,000 seeds have been distributed to the newly-opened low-country estates.

Clove—The history of this is very similar to the last, but the revival of its cultivation is less marked than in the case of nutmeg, and our supply exceeds the demands.

Other spices introduced into Pérádeniya at various periods are:—*Jamaica Allspice, Madagascar Clove, Jamaica Ginger, Grains of Paradise, Lesser Galangal.* The indigenous peppers, cinnamons, &c., are also kept in stock.

PERFUMES.

Vanilla.—From 1853, or earlier, the Director of the Gardens has not ceased to push the cultivation of this, and at one time a large quantity was grown at Pérádeniya, 64 lb. of the pods being sent home for experimental sale in 1866 A few estates now grow this in considerable quantity, and the Gardens continue to keep up a moderate supply.

Of other perfumes, the Gardens contain *Ilang-ilang, Patchouli, Cuscus grass* and *Lemon grass.*

FIBRES.

Cotton.—Experiments were made on the growth of good varieties of cotton in the Garden in 1852-53; and in spite of the unsuitable character of Pérádeniya for the plants, a small supply of different varieties was kept up for many years here in case of demands In 1860–62 there was some attempt at taking up the cultivation in Ceylon of the good sorts, but this soon ceased. At present the "Sea-Island" is the only variety remaining in the Garden.

Manila hemp and *China grass* or *Rheea fibre* were introduced in 1852 and 1853, and are still kept up in the Gardens *New Zealand flax* is now grown at Hakgala, having been long since introduced to Ceylon.

Of DYES, *Arnatto, Indigo, Red Sanders wood, Safflower, Logwood*, and *Turmeric* are growing here. The *Cochineal*-Cactus and insect were introduced in 1853, but did not succeed, and more recently the cultivation of *Saffron* has been attempted

Of OIL PLANTS, the Gardens have introduced the *Oil Palm*, the *Earth nut*, and the *Tallow-tree* of China; and grow *Gingelly* (Tel) oil and other native kinds

TIMBER TREES.

Sandal wood was first grown at the Gardens in 1869, but this was probably a re-introduction, the plant having been lost It does not succeed in Pérádeniya, but plants sent thence to the drier districts are doing well.

Mahogany was introduced before the period to which these Notes refer, and several old trees are in the Garden and scattered over the Island. They rarely fruit, but fresh supplies of seed have been recently obtained from the West Indies

The Gardens have introduced also the *Sal* of India, the *Rain-tree* of Venezuela, and the *Bucare* of Tropical America ("Bois immortelle" of the West Indies), as well as many other foreign timber trees, and several very useful Bamboos.

Of *Fodder plants*, the *Teo-sinte* grass and the *Paspalum (P conjugatum)* have been introduced at Pérádeniya. *Lucerne* has also been experimentally tried. Whether the valuable *Guinea Grass* and the *Mauritius Grass* owe their existence here to the Gardens at an earlier period, I have no present means of ascertaining. The *Algaroba* or *Mesquit Bean* of South America has been recently acquired.

There are also some very important plants which do not come well under any of the above heads

Tobacco.—The Shiraz, Manila, Maryland and Lattakia varieties, introduced in 1853, 1859, 1860, and 1868, respectively, have all been carefully cultivated at Pérádeniya, although the climate and other causes rendered it impossible to keep up a stock on the slight chance of its being enquired for. The kinds are still grown in small quantity, but have now become mixed, and are no longer of much value.

Gutta Percha.—Several sorts have been introduced, the original kind from Singapore in 1869.

India Rubber.—The *Assam* rubber tree seems to have been introduced to Pérádeniya so far back as 1835. For the more valuable South American kinds—the *Para*, the *Central American* and the *Ceara* rubbers—Ceylon is indebted, as in so many cases, to the liberality and public spirit of the Indian Government, and the energy and promptitude of Kew These were introduced in 1876.* Since then some African and Malayan species have been obtained, and are growing very satisfactorily.

To render this list as complete as possible, I may mention the *Divi-divi*, the *Vegetable Ivory*, and the *Cow-tree* of Venezuela, as trees, useful in various ways, which have been at different times brought into the Gardens

Nor should the further facilities for the cultivation of truly tropical species by the establishment of the garden at Henaratgoda be passed over in a notice of what has been done to foster the acclimatization of useful plants in the Colony. This adjunct was opened in 1876, and has proved of great utility in enabling the Botanical Department to keep up a stock of species which with difficulty grew in Pérádeniya.

Appended to this Memorandum is an advertisement from one of the local Newspapers of the plants and seeds on sale at the Gardens in June, 1881. Such advertisements are now prepared quarterly by the Director, and have, it is believed, considerably tended to the spread of "new products" in the Colony. It will be seen that many of the above enumerated species are included in this advertisement.

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* I am desirous of taking this opportunity of putting upon record something of the history of the introduction of the valuable Para Rubber into the East, which has been effected at a large cost and with much trouble. When the Government of India had determined upon the enterprise, a commission was given to Mr. Wickham, then living at Santarem, to collect seed at the rate of £10 per 1,000 He succeeded in obtaining 70,000 seeds in the Ciringals of the Rio Tapajos, which he packed with the greatest care and with a full knowledge of their evanescent vitality; and coming straight home with them arrived at Kew on 14th June, 1876. The following day the whole number were sown; not more however than "about 3¾ per cent germinated, some as early as the fourth day after sowing; and many in a few days reached a height of 18 inches"—(Kew Report, 1876) At Sir Jos Hooker's suggestion it had been previously arranged between the India and Colonial Offices that owing to the want of any accessible and properly constituted Botanical Garden in any part of India suitable for the growth of this completely tropical species, the seedlings should be sent here to Ceylon to be cultivated and propagated for subsequent distributions to Burmah, and other hot and moist districts of the Indian Empire. Owing to the plants' rapid growth, wardian cases of a special form had to be made for their transmission, and, on August 12th, thirty-eight of these, containing 1,919 plants, were despatched from Kew in charge of a gardener (W. Chapman) In due course they were received at Pérádeniya in very good order.

Mr Cross's share in the introduction of Para Rubber was a very small one He also had been sent by the Indian Government to South America to bring home live plants in case the transmission of living seed should prove impossible, and he arrived at Kew on 21st November, 1876. He brought with him about 1,080 seedlings without soil, of which, with the greatest care, scarcely three per cent could be saved. About 100 plants propagated at Kew from these were subsequently sent to Ceylon

The cost of procuring the seeds of Para Rubber, freight, and other expenses appears to have been no less than £1,505 4*s.* 2*d.*, the wardian cases alone costing £120, and the gardener and his passage, £163. The whole of this large expenditure was borne by the Indian Government. An undertaking involving such an outlay as this, it is obviously beyond the power of the Executive of this Colony to carry out; but in this case, it is Ceylon which (from climatic causes chiefly) appears likely to benefit most largely from the successful action of the Government of India

NEW PRODUCTS COMMISSION.

APPENDIX TO REPORT.

From these imperfect notes it will be readily seen how unfounded is the cry that these Gardens have done little or nothing towards the introduction of plants suitable for commercial culture; and also (even if it came within their functions), how impossible it would be to attempt to grow permanently in them large quantities of each and all of these numerous staples.

Pérádeniya, 9th July, 1881

HENRY TRIMEN,
Director.

ADVERTISEMENT REFERRED TO.

PLANTS AND SEEDS AVAILABLE FOR DISTRIBUTION.—JUNE, 1881.

I.—ECONOMIC AND USEFUL PLANTS.

Bixa Orellana (*Arnatto*) seeds, 1 rupee per 1,000.
Camellia Thea, var (Hybrid Assam *Tea*) seeds 5 rupees per 1,000; plants 10 rupees per 1,000 (and at Henaratgoda).
Erythroxylon Coca (*Coca*) plants, 2 rupees per dozen.
Hæmatoxylon campechianum (*Logwood*) seeds, 2 rupees and 50 cents per 1,000.
Arachis hypogæa (*Ground nut* or Oil nut) seeds, 4 cents per packet.
Cæsalpinia Sappan (*Sappan*) seeds 2 rupees and 50 cents per 1,000.
C. coriaria (*Divi-divi*) seeds, 5 rupees per 1,000.
Toluifera (Myroxylon) Pereiræ (*Balsam of Peru*) pods, 5 rupees per 1,000.
Pithecolobium Saman (*Rain tree*) seeds, 2 rupees and 50 cents per 1,000.
Eugenia caryophyllata (*Clove*) seeds, 5 rupees per 1,000
Coffea liberica (*Liberian coffee*) plants, 50 rupees per 1,000, and berries 1 rupee per 100 (and at Henaratgoda).
Pogostemon Patchouli (*Patchouly*) plants, 50 cents per dozen.
Manihot Glaziovii (*Ceara India Rubber*) cuttings, 2 rupees and 40 cents per dozen
Myristica fragans (*Nutmeg*) plants, 20 rupees per 100
Cinnamomum zeylanicum (*Cinnamon*) 2 rupees and 50 cents per 1,000 plants, (and at Henaratgoda).
Bœhmeria nivea (*Rheea* or *Ramee*) plants, 2 rupees and 50 cents a cooly load.
Piper nigrum (*Black pepper*) plants, 8 rupees per 100 (and at Henaratgoda).
Maranta arundinacea (*Arrowroot*) plants 1 rupee per 100.
Amomum Melegueta (*Grains of Paradise*) seeds, 2 rupees and 50 cents per 1,000.
Alpinia Galanga (*Great Galangal*) roots, 5 rupees per 100.
Alpinia officinarum (*Lesser Galangal*) plants, 20 cents each.
Elettaria Cardamomum (*Malabar cardamom*) seedlings, 10 rupees per 1,000, and bulbs 40 rupees per 1,000 (and at Henaratgoda).
Zingiber officinale (*Ginger*) roots, 25 cents per lb.
Vanilla planifolia (*Vanilla*) cuttings, 8 rupees per 100 (and at Henaratgoda).
Elæis guineensis (African *oil palm*) seeds, 50 cents per dozen.
Euchlæna luxurians (*Teo-sinte*), 4 cents per packet.

(AT HENARATGODA ONLY.)

Hevea brasiliensis (*Para Rubber*) cuttings, 20 cents each. (Six only can be supplied to any applicant).
Manihot utilissima (Cassava *Tapioca*), South American var cuttings, 1 rupee per 100.
Cephælis Ipecacuanha (*Ipecacuanha*) plants, 2 rupees per dozen.
Piper Betle (*Betel* pepper) cuttings, 1 rupee per 100.
Theobroma Cacao (*Cacao*) plants, 3 rupees per 100.
Id (pale-fruited var.), 6 rupees per 100.

II.—GARDEN PLANTS, &c

Forest trees.—Seedling plants, 5 rupees per 1,000.
Michelia Champaca (Sapu); Mesua ferrea (Na); Doona zeylanica (Doon); Sterculia fœtida Telemboo); Berrya Ammonilla (Halmililla); Filicium decipiens (Pehimbia); Samadera indica (Samadara); Nephelium lappaceum (Rambutan); Mangifera zeylanica (wild mango); Sandoricum indicum; Adenanthera pavonina (Madatya); Terminalia Belerica (Boolloo); Carallia integerrima (Dawata); Eugenia (Jambosa) malaccensis; Myristica Irya (Eerya); Myristica laurifolia (Malabode); Artocarpus nobilis (Del); Artocarpus Lakoocha (Canna-gona)
Seeds of Grevillea robusta and Casuarina equisetifolia, 5 rupees per oz.
Swietenia (*Mahogany*) plants 2 years old, 25 cents each
Dendrocalamus strictus (Male or solid bamboo), 20 cents each
Bambusa vulgaris (common bamboo), 20 cents each.
Bambusa nana (Dwarf bamboo), 17 cents each.
Bees travancorica (Travancore bamboo), 17 cents each.
Fruit trees, 2 rupees per dozen.
At Hakgala—plum and pear trees, 25 cents each per plant
At Henaratgoda—Kew and Mauritius pine-shoots, 1 rupee per dozen.
Conifers, 50 cents each plant (also at Hakgala); Callitris (Frenela) Gunnii; Thuja occidentalis; T. orientalis; T. Lawsoniana; Cupressus torulosa; C sempervirens; C. Benthanii (Uhdeana; Juniperus bermudiana, var meldensis; J. barbadensis, Cryptomeria japonica.
Palms, 20 cents each
Ornamental trees and shrubs, 50 cents each, 20 cents each, and 2 rupees per dozen (also at Hakgala and Henaratgoda)
Climbing plants, 2 rupees per dozen
Orchids, 6 rupees per dozen.
Bulbs and tuberous-rooted plants, 2 per dozen
Plants in pots (Gesneraceæ, Begonias, Ferns, &c.) 2 rupees per dozen excluding pots
Flower seeds, 1 rupee per packet of 24 sorts
A Wardian case with 40 plants packed for exportation, 40 rupees.

Orders should be addressed to the Director, and none can be attended to unless accompanied by a remittance No orders for seeds can be booked, nor can plants be reserved.

HENRY TRIMEN, M.B.,
Director.

May 31st, 1881

XIV.—1881.

CORRESPONDENCE

ON THE

SUBJECT OF THE ECCLESIASTICAL SUBSIDIES IN CEYLON.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

CORRESPONDENCE

ON THE

ECCLESIASTICAL SUBSIDIES IN CEYLON.

No. 1.

Governor Sir J. R. LONGDEN, K.C.M.G., to the Right Hon. the EARL OF KIMBERLEY.
(Received July 12, 1880.)

The Pavilion, Kandy, Ceylon,
June 9, 1880.

MY LORD,—IN my Despatch of the 6th ultimo,* I had the honor to offer the explanations required by Sir M. E. Hicks-Beach's Despatch of the 3rd March* on various points connected with the estimates for the present year. But there is one subject brought under discussion in that Despatch to which I have not yet replied.

2. Sir Michael Hicks-Beach desired me to consider whether the time had not arrived for passing a new Civil List Ordinance embodying the changes made in salaries and appointments since the passing of the existing Ordinance No. 1 of 1870, which regulates the fixed establishments of the Colony. There is no doubt that it would be convenient to revise that Ordinance, in view of the increase of salary lately granted to the first three classes of the Civil Service, and of the numerous other changes in different Departments which have been made during the last 10 years, but on the other hand there are several questions, some of considerable importance, which must arise in connexion with a revision of the establishments, and it is desirable that these should be settled before proceeding to lay a new Bill before the Legislative Council.

3. Again, the question of the permanent maintenance of the Ecclesiastical Establishments now paid from the public funds cannot fail to revive the discussions which took place in the Legislative Council and in the Colony generally in 1876. At that time a majority of the Council passed a resolution that it would not be expedient to withhold the subsidies hitherto granted to the subsidized churches. Against this resolution a vigorous protest was recorded by four out of the six unofficial members of the Council. This protest was transmitted by Sir William Gregory in his Despatch of the 23rd November, 1876.† A memorial to Her Majesty the Queen against the perpetual maintenance of ecclesiastical establishments was got up outside the Council, and transmitted in Mr. Birch's Despatch of the 15th January, 1877.‡ The receipt of the protest and memorial were acknowledged in the Earl of Carnarvon's Despatch dated 10th of March, 1877,§ but His Lordship stated that he should defer making any reply until he had an opportunity of communicating with Sir William Gregory after the return of the latter to England. There the matter appears to have remained. No reply has been received to either the protest or memorial, and the question is still before Her Majesty's Government, and consequently I do not presume to offer any opinion on it. The ecclesiastical establishments provided for by the Ordinance 1 of 1870 amount to 9,320*l.* divided, unequally, between the Church of England and the Presbyterian Church. If it is your desire that the question of the future maintenance of ecclesiastical establishments should be again brought under the consideration of the Legislature, it would be desirable to deal with it before proposing a new Civil List Ordinance.

4. Upon the whole, I would submit, in reply to Sir M. E. Hicks-Beach's Despatch, that it is desirable to pass a new Civil List Ordinance, but that it should be postponed till next year, in order to afford time for the settlement of the several questions that must be decided before the Bill can be prepared.

I have, &c.,
J. R. LONGDEN,
Governor.

* Not printed. † No. 1 [H. C. 123] of March 1877. ‡ No. 2 [H. C. 123] of March, 1877.
§ No. 3 of same paper.

ECCLESIASTICAL SUBSIDIES.

CORRESPONDENCE.

No. 2.

Governor Sir J. R. LONGDEN, K.C.M.G., to the Right Hon. the EARL OF KIMERLEY.
(Received July 13, 1880.)

The Pavilion, Kandy, June 13, 1880.

MY LORD,—THE proposal made in Sir Michael Hicks-Beach's Despatch of the 3rd of March last,* for a revision of the Civil List Ordinance (No. 1 of 1870) necessarily raises the question whether the fixed ecclesiastical establishment provided for in that Ordinance is to be maintained on the same footing as heretofore, and in a Despatch† accompanying this I have drawn your Lordship's attention to the subject, and to the fact that the protest and memorial against such establishments forwarded by my predecessors in 1876 and 1877 have not yet been answered.

2. As the question has thus been already brought before Her Majesty's Government, I have thought it uncalled for to obtrude any opinion of my own upon it; but having, when Governor of Trinidad in 1871 and 1872, opposed the disendowment of the churches in that Island, and advocated concurrent endowment, I think that it is due to your Lordship and to myself that I should point out that the arguments which led me to advocate concurrent endowment in Trinidad are not applicable to Ceylon, and that I could not advocate here the course of action I recommended in Trinidad.

3. In Trinidad the whole of the native population and the whole of the large immigrant population from the neighbouring countries was professedly Christian. The only non-Christians were the few thousand coolie labourers from India. The Christian Churches, Roman Catholic and Protestant, were spread over the whole Island, and were, so to say, co-extensive with the population. There were few inhabited places in the Island altogether devoid of churches or ministers. In my tours through the country I found Roman Catholic priests ministering in the newest settlements like Montserrat, and in the remote quarters of Toco and Mayaro. This religious organization had been supported and extended partly by voluntary aid, but chiefly by the subsidies paid annually from the Treasury to the different churches, and if those subsidies had been withdrawn it was obvious that the ecclesiastical establishments could not be maintained, and with their disappearance would end the best hopes of ever lifting up the negro population to a higher level of morality and civilization.

4. In Ceylon the circumstances are so entirely different that the considerations by which I was actuated in Trinidad have no place here. The great bulk of the native population is *not* Christian. In fact, all the Christian churches put together do not embrace a tenth part of the population. Of the native Sinhalese, fifteen-sixteenths are Buddhists (1,520,575 out of 1,669,998). Of the Tamils, nine-tenths follow the Hindu religions (472,271 out of 534,339). The Moormen, numbering 163,516, are almost exclusively Muhammedans, and there are Muhammedans also among the other races. The Christians of all the churches number 238,276 in a population of 2,401,066. Of these, 182,618 belong to the Roman Catholic Church, which is not endowed, leaving 55,658 as the total number of Protestant Christians. As regards the question of establishments, even this number is liable to the further deduction of the Nonconformist churches and the Mission churches which enjoy no aid. The actual numbers of members of the English and Scotch churches returned as such in the census of 1871 (from which I have taken the preceding figures) are :—

Church of England	...	...	10,379
Presbyterian Church	...	...	3,101

The fixed establishment provided by the Ordinance 1 of 1870 is :—

			£
Church of England	...	...	7,520
Presbyterian Church	...	...	1,800

5. In presence of a state of things so utterly different to the circumstances of Trinidad, I do not feel that I am guilty of any inconsistency in holding myself at liberty to concur in the withdrawal of the subsidies now paid to the above churches, with of course full protection to the interests that have been created or continued under the Civil List Ordinances.

6. I believe that, under any circumstances, the question of disendowment will be brought forward by its advocates in the next session of the Legislative Council, and I shall be glad if I can be favoured with an expression of your Lordship's views before the opening of the session which will take place early in September.

I have, &c.,
J. R. LONGDEN,
Governor.

* Not printed. † No. 1.

No. 3.

Governor Sir J. R. LONGDEN, K.C.M.G., to the Right Hon. the EARL of KIMBERLEY.
(Received September 4, 1880.)

Queen's House, Colombo, Ceylon,
August 7, 1880.

MY LORD,—IN a conversation which I recently had with the Bishop of Colombo, his Lordship expressed a desire to have an opportunity of offering some remarks upon the subject of the subsidies now paid to the Church of England before any step in regard to them was finally decided upon. I at once invited him to lay his views before the Government, and I hasten to forward to your Lordship the accompanying letter, in which the Bishop has put forward the considerations which in his opinion should be borne in mind in dealing with the subject.

2. I feel sure that every attention will be paid to the Bishop's representations, the more so as his Lordship does not on principle oppose the withdrawal of the subsidies, though urging that they should be withdrawn gradually.

3. The Bishop's letter requires few comments from me. The arguments by which the Bishop endeavours to prove that the Church of England here has, through the appointment by the Queen of its Bishops, been placed in the position of an Established Church can have but little practical effect in the consideration of the question of the maintenance or withdrawal of the subsidies, which will be decided upon principles wholly foreign to those of ecclesiastical law. Nor do I attach importance to the allusions made to the concessions granted to the Buddhists. These concessions were without doubt originally made for political reasons, and in practice they amount to no more than the concessions which were made to the Christian Churches in Colombo and the Sivites in Jaffna, viz., the retention of their property and the free exercise of their religion.

4. I entirely agree with the Bishop in thinking that in any change vested rights should be respected, but I cannot reckon among vested rights the expectation of promotion, especially among the lower officers of the Department, on which the Bishop lays so much stress. No such right has ever been recognized, and even the reasonable claims of the resident clergy to the higher posts in the Ecclesiastical Department have been sedulously ignored. A reference to the Blue Book will shew that the bishopric, and three out of the four highest paid chaplaincies, carrying annual salaries ranging from 6,000 rupees to 7,000 rupees, have all been filled by new appointments made from England within the last five years, while the seven lower paid chaplaincies, ranging from 1,250 rupees to 4,000 rupees, have been filled by the present holders for periods varying from twenty-eight years to six years. It is manifest that a right cannot now be recognized which has been so long and persistently ignored.

5. The Bishop in a note to Schedule B. estimates the number of people who belong to the subsidised churches at 10,000, and the total number of members of the Anglican Church throughout the whole Colony at twice that number. These estimates are very moderate. The number of persons who returned themselves as members of the Church of England in 1871 was 10,379, while 24,756 returned themselves as Protestant, of whom no doubt many belonged to the Church.

6. Upon the main question raised by the Bishop, viz., after what lapse of time the subsidies shall cease, or rather commence to cease, I would only remark that whatever delay be accorded will, in my opinion, merely delay the commencement of the efforts that will ultimately have to be made to sustain a ministry after the withdrawal of State aid. Some of the incumbents of the present chaplaincies will, it is hoped, retain their duties and their salaries for a long period, others may be expected soon to retire; but if, as I sincerely trust, existing interests are strictly respected, the withdrawal of the subsidies will be gradual, whether commenced at once as vacancies occur or delayed for some years as asked by the Bishop.

I have, &c.,
J. R. LONGDEN,
Governor.

Enclosure in No. 3.

The LORD BISHOP of Colombo to His Excellency the GOVERNOR.

Colombo, August 4, 1880.

SIR,—IN accordance with your Excellency's desire expressed in your letter of June 25th, that, as representative of the Church of England in Ceylon, I should lay before your Excellency, for transmission to the Secretary of State, my views upon the subject of the subsidies now annually paid to the Anglican Church, I have the honor to submit the following facts and opinions on (1) the present force and effect of those subsidies and of the conditions attached to them, (2) the claims which may be urged against the sudden withdrawal of them, (3) the considerations which ought to be borne in mind if the time should arrive for modifying or withdrawing them.

ECCLESIASTICAL SUBSIDIES.

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I will not exhaust your Excellency's patience by attempting on this occasion to deal as fully with the subject as I might, but should the Government hereafter be contemplating actual steps in reference to it, I hope I may be allowed a further opportunity of addressing your Excellency upon it.

The effect of the subsidies and their attendant conditions is not limited to the persons to whom salaries are paid, nor even to the congregations for which ministrations are provided; it extends to the whole Anglican Church in Ceylon and all its members, whose *status* and liberties and security are thereby affected.

In speaking of the subsidies as paid to the Anglican Church, your Excellency recognizes that the Church community and not a State Department only is affected; and I venture to add to this, that that community is affected, not merely by the subsidies received, but by the conditions attendant on those subsidies. These conditions do not amount, I believe, to establishment, and yet they involve a considerable part of the effects of establishment, and did, at an earlier date, approximate very closely to it.

To shew how much the entire Church of England community is affected by the conditions attached to the subsidies, I need only point to the fact that the Bishop is not only paid, but appointed by the State. It is not for me to discuss the advantages or disadvantages of this, but it is clearly a very important point. The whole Anglican community, clergy and laity, find themselves excluded from the rights and responsibilities of self-government. Not the Department only, nor even the clergy only, but the whole community see the privilege of ordination, the distribution of offices, the tenure of a great part of their property, in the hands of one who is not, strictly speaking, responsible to them at all. The whole Church of England community is thus so closely dependent on the State, that it is very far from being merely the recipient of subsidies.

Again, by the letters patent creating the diocese, which are, I presume, among the conditions of the subsidies, the whole Anglican community in Ceylon becomes affected by the ecclesiastical law of England; for though the clergy and congregations are not as such bound to anything more than the Book of Common Prayer and the general laws of the Christian Church, the Bishop is obliged, in hearing cases, to decide them according to the ecclesiastical law of England. The Anglican community in Ceylon is thus put, by the condition attached to these subsidies, in the position occupied by the Established Church in England, as contrasted with that of the Church in Scotland, Ireland, America, or New Zealand. I am far from intending to represent this as an evil, but only to shew that the subsidies, by their conditions, so greatly affect the liberties of the whole Anglican community, that if establishment is too large a name, subsidies is certainly too small a one. So far, however, from considering this present dependence as an evil, I would urge that it constitutes so large an element in the security which the Anglican community here enjoys, that its sudden removal would be a serious injury.

Further, the Church of England in Ceylon, from the first occupation of the Island by the Crown, has been, if not an established, at least a preferred Church. From the passages which I append from Ordinances and Regulations, it will appear that Government, in urging Christianity upon the people of Ceylon, expressly recommended the Church of England and its Book of Common Prayer, that by entrusting the control of civil marriage and State education to the officers of the Church of England, it exhibited and rendered very practical the same preference. It may be added that the State regulated by Ordinance the affairs of the Church of England, when it did not regulate the affairs of any other body (as in the Ordinance 12 of 1846, and in that regulating Kandy Church), or in other words, that while other bodies have been subsidized, it is in the case of the Church of England alone that those subsidies, in cases not concerning the Ecclesiastical Department, were accompanied by control. These facts have combined to associate with the relation of the Church to the State a *prestige* more nearly akin to that of establishment than to anything which mere subsidies could convey. This preference, however, has not of late been shewn, the Church of England has been treated as strictly on an equality with other "denominations;" the *status*, however, which it has conveyed still remains, and though not precious from a spiritual point of view, constitutes an element not to be overlooked in estimating the present effect of the subsidies.

But chiefly I would desire to insist that the appointment of the Bishop by the State, and the assertion of English law by the letters patent, affect the whole Church community so greatly, that their removal, which I conceive to be a necessary condition of the withdrawal of the subsidies, would be a revolution in the Church such as might be beneficial if gradually accomplished, and with sufficient prepration, but might be ruinous if suddenly thrust upon us.

This consideration will appear far more serious when the nature of the Church of England in Ceylon, and especially of that part of it most directly touched by the subsidies, is taken into account. It is in large part, as I will presently shew, a Native Church, composed in the larger proportion of descendants of members of the Dutch Protestant Church, and in a much smaller proportion of more recent converts; and this Native Church it is which is now under the protection of Government support, the guidance and restraint of English ecclesiastical law, and of a State-appointed Bishop. Now, however beneficial it may ultimately be to such a community to have to learn to stand alone, it is clear that it may be little less than ruinous for it to be suddenly deprived of support,

guidance, and restraint without ample warning and preparation. The proper constitution of Native Churches, how far they should be independent of, and how far united with the European element, how far their laws and their formularies should differ from those of England, these are problems still awaiting solution, and confessedly difficult. To confront the Native Church in Ceylon suddenly with these problems in the present stage of such questions might greatly injure the prospects, not only of that particular Church, but of others, especially those in India, with which it is ecclesiastically connected. I would urge then that an important effect of the present system is that it supports and guides the Native Church, by connecting it with English law and influence in a most salutary way.

In vindicating what appear to me to be the claims which may be urged against the sudden withdrawal of the ecclesiastical subsidies, I would distinguish the claims of individuals from those of congregations, and among the congregations I must distinguish between those which are chiefly English (which are very few) and those which are more or less directly representative of the Native Churches, which the English, at the end of the last century, found existing.

In regard to the claims of individuals it is, I believe, an acknowledged principle, that vested rights should be respected in such a matter, and I have only to point out that in addition to actual rights which can be exactly defined, the officers of the Department have interests less tangible but very far from inappreciable, which would be affected injuriously by a sudden suppression of officers. The lower officers especially have a reasonable expectation of promotion. It amounts to a claim in no case: in the higher offices it is sometimes ignored; but it has an appreciable value in all, and a very substantial value in the lower offices. This expectation would be entirely destroyed by an order which should decree that no future vacancies should be filled. The cessation of promotion would be a particularly serious blow to the native clergy and catechists, who form the majority of the officers of the Department. For these, from their nationality, cannot seek promotion elsewhere, and the effect of disendowment will be to compel us to employ fewer clergy in the diocese as a whole. And I need hardly point out that the absence of promotion means, to a young clergyman, not merely that his income will remain small, but that his sphere of usefulness will remain limited and unchanged,—a most serious disadvantage. But if the cessation of new appointments were ordered to take effect, not suddenly but after some years' warning, this would be remedied in two ways: the ordained native clergy would have moved on into the higher offices, or perhaps have been provided for outside the Department, and also the additional time given to the diocese for preparation would have made it less necessary to diminish the whole number of clergy employed.

The claim of congregations is one which I regard as far more important than that of individuals. The withdrawal of subsidies would affect not only office-holders, but all the laity of the Church of England in Ceylon, and especially those who are now ministered to, and whose churches are in some cases kept in order, &c., at the expense of the State. I venture to urge that if any act is to be done affecting the interests of so many of Her Majesty's subjects, it ought to be done in the way which will injure them least. Were the Church of England community in possession of advantages unlawfully acquired or held, it might be right to dispossess them suddenly and without notice; but the advantages in our possession being such as we have lawfully acquired and lawfully held up to this moment, we ought, I submit, to be dispossessed of them only in such a way and at such a time as will injure us least. The most injurious way possible is to announce, after a vacancy has occurred, that it will not be filled up. The congregation is then left both without funds accumulated to meet such an emergency, and, what is often more important, without rules for electing or appointing, supposing any funds to be obtainable. This is so injurious a method that I cannot suppose Her Majesty's Government would in any case contemplate it. Another plan which I know is thought by some to be the right one, is that the Government should announce, while an office is full, that it will not be filled up again. This, however, I venture to urge, may prove to be very disastrous to the congregation affected. In the first place, they have no certain knowledge what effort is required of them. It may be—in some cases they will think it probable that it will be—many years before they are thrown on their own resources, and therefore they will not prepare as men will do who have a definite date before them. Secondly, it is possible that the vacancy may occur immediately after such an announcement, before the congregation have had any time to prepare at all. The great injury which might result from this will be evident by supposing it to occur in the case of the bishopric, where the congregation affected is the whole Church in the Colony. Were the Bishop to die immediately or very soon after it had been announced that his vacancy would not be filled, the method and conditions of appointment would be unfixed, and rules affecting the whole constitution of the Church for the future would have to be decided, not calmly, but in face of a special case, and confusion, if not division, would be the almost certain result.

But if it were announced beforehand that vacancies occurring after such and such a future date would not be filled up, then none of these inconveniences would occur. Time would be given for fixing the constitution of the whole body, and the conditions of particular appointments, the efforts of congregations would be directed to preparing for a specified date. [For the period in their view would be, not the actual demise of an

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incumbent, but the date after which such vacancy would be unfilled; and the whole Church community would require of each congregation that it should provide against that date.]

In the interest, therefore, of all the congregations affected by the subsidies [and this, in the case of the Bishop, includes the whole Church], I urge the justice not only of the gradual withdrawal, but of gradual withdrawal commencing from a period previously announced, and the longer that period is, the less will the interests of the Church be imperilled.

I am not prepared to urge, on behalf of the Church of England in Ceylon as a whole, any claim for the indefinite continuance of the State assistance. I am not aware that, as a Church, we have any right to it; nor am I sure that its permanent continuance would be to our ultimate advantage. But I urge, with the more confidence, our claim to be allowed to yield up what is not stolen property in the way least inconvenient to ourselves.

What the special claims of the Civil Servants of the Crown, who when they were appointed, found certain gratuitous ministrations among the advantages proposed to them may amount to, I am not able to say; and it will no doubt be duly considered by Her Majesty's Government. The majority of the English residents have no such claim, and will not be the chief losers by the withdrawal of subsidies.

But the case of the native congregations is very different. Of the colonial chaplains and catechists, there are only two in whose congregations the English form a majority; these are the chaplains of St. Peter's, Colombo, and of Nuwara Eliya. There are two colonial chaplaincies (of Kandy and Galle) in which the English form an appreciable proportion, and one (Jaffna) in which they form a small proportion. The other colonial chaplains and catechists minister exclusively, or all but exclusively, to natives of Ceylon; the chaplain of Holy Trinity, Colombo, to Dutch and Portuguese descendants, the Sinhalese, Tamil, and Portuguese chaplains in Colombo, the Sinhalese chaplains of Galkissa and of Moratuwa, ministering to the races and in the language which their titles imply; and the remaining members of the Department are all native ministers. (*See* Schedule A. "List of clergy and catechists, with the languages in "which they minister and the races to which they chiefly minister.") What proportion of the whole number ministered to by the Department consists of native Christians can be fairly gathered from the above account of the ministers themselves, and from the returns of the various congregations it appears (though these returns are very imperfect) that the native element amounts to nearly three-fourths of the whole. (*See* Schedule B. "Average Sunday Attendance, &c.") Out of 2,634, which was the average of attendants at the churches assisted by the State, 1,439 belonged to native races, and 549 were English, while 646 is the number in the mixed congregations attending services in English. Of these 646 at least three-fourths would be natives of the Island There are no such returns from the catechists, but these would all go to increase the proportion of natives. The whole proportion, therefore, of Ceylonese to Europeans is rather over than under three to one.

It is, therefore, in the main a Native Church which is being subsidized.

To this Native Church, as I would respectfully urge, Her Majesty's Government is bound in two ways. First, by a quasi-treaty obligation, and, secondly, by the duty which an adopting father owes to an adopted child, not suddenly to dismiss one whom he has brought up.

Her Majesty's Government is bound to this Native Church by a quasi-treaty obligation. When the Crown took possession of the maritime provinces of Ceylon, there were among its new subjects a very large number, it is said 340,000, professing Protestants of the Dutch Church. The system of proselytism, almost amounting to compulsion, which the Dutch Government had employed, had produced this large number of adherents, and many of them being insincere, the majority ceased to be even nominally Christians when that pressure was removed; but of the remainder, our present subsidized Native Church is the direct descendant, having received only small additions by missionary effort (for the converts made by missionaries are not among the subsidized congregations) and greatly diminished in numbers by the defection of the insincere, who have returned to the profession of Buddhism.

When the British Government first occupied the Island, these native Protestant Christians were found in enjoyment of ample subsidies, State recognition, and a large staff of State-paid teachers and ministers. It was announced in Art. 18 of the Capitulation of Colombo, "The clergy and other ecclesiastical servants shall continue in their functions, and receive the same pay and emoluments as they had from the Company," and though this might be held to refer only to the individual holders of offices at the time being, the principle of continuing the provision made by the Dutch was recognised in the Proclamation of December 1st, 1799, in the following terms: "We, Frederick "North, Governor of the Island of Ceylon, &c., &c., do inform all native headmen, "schoolmasters, and inhabitants within the jurisdiction of Colombo, that it is our earnest "desire that the Christian religion should be continued and propagated as much as "possible, and therefore do order all the afore-mentioned persons to assist, every one in "their offices and situations, in order that the Christian religion which has been planted "with so much labour in this Island may be cultivated to the glory of God and for the "salvation of the immortal soul. The schoolmasters are most seriously ordered to fulfil "their duties, the native headmen to afford the necessary assistance to the schoolmasters,

" and the inhabitants to send their children diligently to school, to the glory of our most " beloved Saviour and to spread forth His Kingdom." Nor did this interpretation of the quasi obligation entered into by Her Majesty's Government towards the existing Protestant body limit that obligation to the Presbyterians; on the contrary, Her Majesty's Government distinctly asserted the maintenance of the Church of England to be equivalent to the maintenance of the existing Christian Church, by directing the Liturgy of the Church of England to be used in schools, and by the following language: "Whereas it " has pleased Almighty God by the operation of His Holy Spirit and the ministry of " sundry pious men, to call to the knowledge of His Grace and the way of salvation " through faith in our Lord Jesus Christ the inhabitants of this Island in a manner " distinguished from the surrounding nations of India. We, considering it our bounden " duty to take care under His Divine Providence that the seed of His Gospel be not " choked with tares nor lost by neglect, have commissioned the Reverend Charles Frederic " Shroter, Minister of the Word of God, to translate the Liturgy of the Church of " England into the Malabar language, which translation being completed, we hereby " order that it may be duly read and used in all established Malabar churches, chapels, " schools, and seminaries maintained by Government for the use of Protestant Christians " of this Island." (*Proclamation, May 24th*, 1800.)

Thus was the Church of England maintained by Her Majesty's Government and urged upon the people as a continuance of the Dutch efforts to maintain Christianity, and it clearly cannot be urged that the Dutch Presbyterians, by joining the Church of England under such sanction, forfeited their claim on the British Government.

It is a significant indication of this descent, that our present Siṇhalese colonial chaplain in Colombo, the Siṇhalese colonial chaplain of Galkissa, and the Tamil colonial chaplain are all descended from or closely connected by descent with ministers who held similar offices under the Dutch Government.

That the Church of England continued to be pressed upon the people as the authorized form of Christianity, is clear from the provisions made in 1815 and 1822 for regulating marriage among Protestants, in which the rites and ceremonies of the Church of England are indicated as the most probable form of marriage, and the whole put under the control of the Archdeacon of Colombo. (*See* Schedule D. (1), (2), (3).)

It thus appears that the Native Church now subsidized, and forming three-fourths of the subsidized Church, is the direct descendant of that which the English found in existence in 1796, and that in its Anglican form it is a legitimate representative of that body. Even if the 15th Article of the Colombo Capitulation refers only to individuals, or, if that capitulation has been superseded, there is still a quasi-treaty obligation; for it is probable that the only reason why the maintenance of the Protestant Church was not definitely guaranteed by treaty lay in the fact that it was taken for granted that it would be continued, which was for many years the undisputed interpretation put by practice upon that silence.

It was not possible that the British Government could intend to treat the Dutch Protestants less liberally than the Buddhists of the Kandyan Provinces, to whom abundant guarantees were given; surely not because their religion was more to be supported than that of the Protestants, but because it could not be taken for granted as was the case with Protestantism—that the British Government would maintain it. [*See* the guarantees to Buddhism quoted in Schedule E. (1), (2), (3). The immunities there provided are still enjoyed by the Buddhists, and represent a contribution from the revenue many times as great as that received by the Church of England. According to the report of the Temple Lands Commissioners appointed in 1857, the Buddhist "Church" in the Kandyan Provinces possesses in fee-simple no less than 376,000 acres of land. This land is exempt from the land tax, to which all other lands in the Island when cultivated with taxable grain are liable. Under section 50 of the Road Ordinance, Buddhist priests are exempted from the performance of labour on the roads, and consequently from the payment of the labour commutation rate. The ministers of no other denomination enjoy this exemption, which amounts to not much less than 10,000 rupees per annum in all. It thus appears that the Buddhist religion, that of the majority, is the most materially subsidized religion.]

I am aware that my argument might point to a conclusion larger than that which I require to draw from it; it might point to the conclusion that the Native Church ought never to be deprived of State assistance; but I would only press it so far as to urge that it constitutes a reason for dealing with special tenderness with the Native Church, and giving them abundant notice before any withdrawal of their subsidies begins.

To this I would add that Her Majesty's Government owes to these congregations the debt which an adopting father owes to an adopted child, not to turn it out upon the world till it is of age to take care of itself. These congregations are Anglican mainly because Her Majesty's Government has urged them to become so (I am speaking not of individuals but of communities), and have depended on subsidies, not through any fault of their own, but because they have been led to do so constrained, I may say, to use the ministrations of the subsidized ministers—by Her Majesty's Government. They have not learnt the art of self-government. I venture to add that the Church of England—in her small and recent experience of free churches, and still more of Oriental churches—is hardly ready to teach it to them. To throw upon this Ceylon Church suddenly the responsibility of self-government, will be to do it a great and undeserved injury. Gradually given, and after

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ample warning, that responsibility will be a boon; suddenly given, it might be ruinous. It is not with the Native Church as with Englishmen resident in the Colony. The natives have been long used to associate religion with State encouragement; they will not easily distinguish—if it is suddenly done—between the withdrawal of subsidies and State discouragement.

On such grounds as these I would urge that the Native Church is entitled to a long warning before the withdrawal of subsidies from their ministers or Church. The claims of the English part of the Church would be, I think, fairly considered, if five years were allowed to elapse between the announcement and the commencement of the suppression of offices; but in the Native Church not less than 15 years should be claimed; or if it should be thought more convenient that the withdrawal should commence for all at the same date, then at the least 10 or 12 years should be granted to the Department as a whole.

I have occupied a larger space than I intended with this part of my subject, and since, if my argument has weight with Her Majesty's Government, no immediate proceedings as to detail will be taken, I will ask leave to postpone my suggestions, as to the provisions which should accompany the withdrawal of subsidies, until the present letter has been submitted and considered.

I have, &c.,

R. S. COLOMBO.

SCHEDULE A.

LIST OF CLERGY AND CATECHISTS, with the Languages in which they minister, and the Races to which they chiefly minister.

Colonial Chaplains.	Languages in which they minister	Races ministered to
St. Peter's, Colombo ...	English	English.
Holy Trinity, Colombo ...	English	Dutch and Portuguese descendants.
All Saint's, Colombo ...	Siṇhalese	Siṇhalese.
St Paul's, Colombo ...	Portuguese	Portuguese descendants.
St Thomas', Colombo	Tamil	Tamils
Galkissa and Milágraya ..	Siṇhalese	Siṇhalese
Moratuwa and Koralawelle	Siṇhalese	Siṇhalese.
All Saints', Galle ...	English	English and Dutch descendants
St Paul's, Kandy ...	English ...	English and Dutch descendants
Nuwara Eliya ...	English	English.
Mannár	English and Tamil ...	Dutch descendants and Tamils.
Catechists.		
Koṭahéna, Kehelwatta, and Captain's Garden ..	Tamil	Tamils.
Gaol, Civil, and Leper Hospitals, and Grandpass .	Tamil ...	Tamils
Ratnapura ...	English and Siṇhalese ...	Dutch descendants and Siṇhalese.
Slave Island	Siṇhalese .	Siṇhalese.
Kohilawatta . ..	Siṇhalese	Siṇhalese.
Pánaduré ...	Siṇhalese	Siṇhalese.
Batticaloa	English and Tamil ...	Dutch descendants and Tamils.
St Paul's, Colombo	Portuguese	Portuguese descendants.
Hambantoṭa	Siṇhalese	Siṇhalese.
Chilaw ...	English and Tamil ...	Dutch descendants and Tamils
St. Thomas', Colombo ...	Tamil ...	Tamils
Kalpitiya ...	English and Tamil . .	Dutch descendants and Tamils.
Puttalam	English and Tamil ...	Dutch descendants and Tamils.
Badulla	English, Siṇhalese, and Tamil...	Dutch descendants, Siṇhalese, and Tamils.

SCHEDULE B.

AVERAGE OF SUNDAY ATTENDANCE AT MINISTRATIONS OF CHAPLAINS AND AIDED CHAPLAINS.

Year	English only, or chiefly.	Mixed.	Burghers only.	Native languages only.
1877 ..	525	693	200	1,079
1878 ..	649	730	200	1,221
1879 ...	549	646	208	1,231*

* This return is, I believe, defective.

Counting three-fourths of the mixed congregations as Ceylonese, the proportion of English and Ceylonese are—

Year.	English.	Ceylonese.	Total.
1877 ...	698	1,799	2,497
1878 ...	831	1,969	2,800
1879 ...	710	1,924	2,634

These returns do not include any from catechists, which would swell the side of the Ceylonese.

NOTE.—The total average Sunday attendance will appear lamentably small, and is, when all has been taken into account, much smaller than it should be. But the number of adherents (of the subsidised churches) which it represents is larger than might be gathered from such an average, for two reasons:—the large areas over which, in some cases, the congregations are scattered, and the impossibility, real or supposed, even for natives of the Island in all but the poorest classes, of coming to church without some kind of carriage.

The number of sincere adherents (of the subsidised churches) may be probably estimated at 10,000, and the whole strength of the Church of England at twice that number.

SCHEDULE C.

(1.) The clergy and other ecclesiastical servants shall continue in their functions and receive the same pay and emoluments as they had from the Company. [*Capitulation of Colombo, February* 15, 1796, *Art.* 18.]

(2.) We, Frederick North, Governor of the Island of Ceylon, &c., &c., do inform all native headmen, schoolmasters, and inhabitants within the jurisdiction of Colombo, that it is our earnest desire that the Christian religion should be continued and propagated as much as possible, and therefore do order all the afore-mentioned persons to assist, every one in their offices and situations, in order that the Christian religion, which has been planted with so much labour on this Island, may be cultivated to the glory of God and for the salvation of the immortal soul. The schoolmasters are most seriously ordered to fulfil their duties, the native headmen to afford the necessary assistance to the schoolmasters, and the inhabitants to send their children to school, to the glory of our most beloved Saviour, and to spread forth his kingdom. [*Proclamation, December* 1, 1799.]

Whereas it has pleased Almighty God, by the operation of His Holy Spirit and the ministry of sundry pious men, to call to the knowledge of His Grace and the way of salvation through faith in our Lord Jesus Christ, the inhabitants of this Island in a manner distinguished from the surrounding nations of India. We, considering it as our bounden duty to take care under His Divine Providence that the seed of His Gospel be not choked with tares nor lost by neglect, have commissioned the Rev. Charles Frederic Shroter, minister of the word of God, to translate the Liturgy of the Church of England into the Malabar language, which translation being completed, we hereby order that it may be duly read and used in all established Malabar Churches, chapels, schools, and seminaries maintained by Government for the use of Protestant Christians of this Island. [*Proclamation, May* 24, 1800.]

SCHEDULE D.

(1.) Whereas the number of persons at present authorized to perform the ceremony of marriage in this Colony is insufficient to afford due opportunity to the native Protestants to unite themselves in matrimony.

For remedy thereof, it is hereby enacted that it shall be lawful for the Governor or Lieutenant-Governor of the British Settlements in the Island of Ceylon to appoint by warrants to that effect such further number of persons as may be necessary for the said purpose.

And all marriages of persons known by the description of natives and professing the Protestant religion, which have been heretofore or may hereafter be celebrated within the Island of Ceylon by persons who have been heretofore or may hereafter be authorized and appointed to that effect by the Governor or Lieutenant-Governor for the time being, shall be legal and valid to all intents and purposes.

And it is hereby enacted that all such marriages shall be celebrated according to the forms now lawfully used.

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And whereas many native Protestants have been married in different parts of the British Possessions of this Island by the several missionaries resident therein, it is hereby enacted that all such native Protestants as have been married by the said missionaries before the date of this regulation shall be deemed to have been legally married. [*Regulation, No. 7 of* 1815.]

2. And it is further enacted that all natives of the maritime settlements of this Island or of India, residing in the said maritime settlements, professing the Protestant faith, shall before the registry of their marriages, or as soon after as may be possible, be married according to the rites and ceremonies of the United Church of England and Ireland, or other Protestant form, by such persons as shall be licensed to perform such marriages, and of whom a sufficient number shall be, from time to time, and at least once in each year, sent into such parts of the maritime settlements, wherein there is no resident licensed person, to perform such marriages; and any persons professing the Protestant faith, who shall have been registered, and shall neglect to avail themselves of the first opportunity of having their marriage celebrated before a licensed person, shall be liable on conviction before any competent magistrate to pay a fine not exceeding 20 rix dollars, half whereof shall go to the party who shall inform the magistrate of such neglect. [*Proclamation, No. 9 of* 1822, § 11.]

3. And it is further enacted that all licenses issued under the 7th regulation of the year 1815, to persons to celebrate marriages among native Protestants, shall be called in and renewed, and that in the same shall be inserted the place where such persons may usually celebrate such marriages; and no marriage shall be celebrated in any other place by such licensed person, unless on the production of a license to that effect from the Archdeacon of Colombo or person acting as such, which license shall be issued on a stamp of 25 rix dollars, and any licensed person celebrating a marriage contrary to this enactment shall be liable to pay a fine not exceeding 100 rix dollars for each offence. [*Ibid*, § 12.]

SCHEDULE E.

1. The religion of Buddhu professed by the chiefs and inhabitants of these provinces is declared inviolable, and its rites, ministers, and places of worship are to be maintained and protected. [*Kandy Convention, March* 2, 1815, *Art.* 5.]

2. As well the priest as all the ceremonies and processions of the Buddhu religion shall receive the respect which in former times was shown them. At the same time it is in no wise to be understood that the protection of Government is to be denied to the peaceable exercise by all other persons of the religion which they respectively profess, or to the erection under due license from His Excellency of places of worship in proper situations. [*Proclamation, November* 21, 1818, *Art.* 16.]

3. The Governor, desirous of showing the adherence of Government to it stipulation in favour of the religion of the people, exempts all lands which now are the property of temples from all taxation whatever, but as certain inhabitants of those villages are liable to perform fixed gratuitous services also to the Crown, this obligation is to continue unaffected. [*Ibid, Art.* 21.]

No. 4.

The Right Hon. the EARL OF KIMBERLEY to Governor Sir J. R. LONGDEN, K.C.M.G.

Downing Street, November 19, 1880.

SIR,—I HAVE carefully considered your Despatch of the 9th of June,* in which you point out that the question of discontinuing the ecclesiastical stipends from public funds in Ceylon, which was brought before my predecessor by Governor Sir William Gregory in 1876-7, still remains undecided, and that it is desirable that it should be settled before proceeding to the proposed revision of the Civil List Ordinance, by which some of those stipends are provided, together with your Despatches of the 13th of June and the 7th of August,† in the latter of which you transmit a letter on the subject from the Bishop of Colombo, dated the 4th of August.

2. From the correspondence which took place on this subject in 1876-7, it appears that out of the total population of Ceylon, amounting at that time to 2,400,000, 250,000 were Christians, of whom 190,000 were Roman Catholics, and 45,000 belonged to unassisted Protestant denominations, leaving only 15,000 Anglicans and Presbyterians as the recipients of the State contribution of some 10,000*l.* per annum for ecclesiastical purposes. I am content to rest the argument against the continuance of the present arrangements on these figures, although those in the 5th paragraph of your Despatch of the 7th of August are perhaps even more favourable to it.

* No. 1. † Nos. 2 and 3

3. Her Majesty's Government are of opinion that it is impossible to justify such inequality of endowment as between the Christian denominations, more especially as it appears that the main burthen of the work performed by Protestant Ministers in Ceylon falls upon those who receive no assistance from the State.

4. In some Colonies the system of concurrent endowment has been adopted, but it is clear that in Ceylon it would be altogether beyond the resources of the Colony to apply this principle upon the basis of the very liberal grant at present received by the small body of Anglicans and Presbyterians. They have therefore, after careful examination of the whole question, come to the conclusion that the only fair and practicable course will be to withdraw gradually, as vacancies occur, the whole provision now made for ecclesiastical purposes from public funds in Ceylon, taking care that the stipends of present incumbents shall be secured to them so long as they continue in the discharge of their present functions, together with their pension rights and any other emoluments which they enjoy.

5. I am informed that Christian communities hold property in various parts of the Island, and that in some cases these communities, which are of old standing, consist entirely of natives. I have not at present before me the particulars of such property, but you will of course understand that landed or other endowments or emoluments which may be derived from other sources than public funds are not in any way to be interfered with.

6. I have read attentively the letter of August 4th from the Bishop of Colombo, but I am not able to perceive that he adduces any sufficient reasons for departing from the main principles of the procedure which I have indicated above, and which is that which has been followed in Jamaica and other Colonies in the West Indies, in which the ecclesiastical stipends from public funds are in course of withdrawal, and you have shown good reasons for not acceding to the Bishop's proposal that promotions should be made to the more highly-paid chaplaincies, and that the disendowment should be made to take effect gradually from below. But I am disposed to entertain the Bishop's proposal that a period of grace should be allowed before the commencement of the withdrawal of the stipends, although not for the whole length of time suggested by his Lordship. Such period of grace might be for five years, so that in the event of vacancies occurring during that period the stipends should not fall in, but should continue to be paid to the Church body.

It might also be provided that the average annual expenditure (if any) for the last five years on the maintenance of fabrics or other incidental charges shall be issued for the same period, at the end of which all churches and parsonages (if any) which are kept in repair at the public expense should be handed over to the Church authorities in good repair.

7. I shall be obliged by your considering this outline of the arrangements which I am disposed to consider applicable to the circumstances of the case, and if you see no objection to them it will be convenient that you should cause an Ordinance to be prepared, which should be submitted to me for examination before it is introduced.

8. On the discontinuance of the grants, the various religious communions hitherto receiving them being of course relieved from all State interference should be enabled to organize themselves in such manner as may be most convenient for the management of their own affairs, and with this view I should wish you to consider whether an Ordinance should be passed providing for the incorporation of Church bodies, by which the affairs of the respective communions may be administered, and to which during the period of grace the moneys referred to in the preceding paragraph of this Despatch may be paid. By way of example I may refer you to the Church of England bodies created in Jamaica (pp. 3–5 of annexed Par. Paper) and in Trinidad (pp. 91–95 of same Paper).* I annex a copy of the Ordinance† which was passed to carry into effect the arrangement decided upon for Trinidad.

When these arrangements are completed, no further grants will be required for ecclesiastical purposes than may be necessary for the temporary purposes which I have explained above, and you will therefore, in revising the Civil List Ordinance, only make provision accordingly.

I am, &c.,
KIMBERLEY.

No. 5.

Governor Sir J. R. LONGDEN, K.C.M.G., to the Right Hon. the EARL OF KIMBERLEY.
(Received February 28, 1881.)

The Pavilion, Kandy, Ceylon,
January 31, 1881.

MY LORD,—IN my Despatch of the 2nd November last,† I had the honour to report for your Lordship's approval three acting appointments I had made in the Church, upon the recommendation of the Bishop of Colombo, in consequence of the retirement of the

* H. C. 259 of 1873.

† Not printed.

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Rev. Mr. Kelly, and your Lordship was pleased to approve these acting appointments by your Despatch of the 27th November, 1880.*

2. At the time I reported these appointments I had not had the honour to receive your Lordship's Despatch dated 19th November last,† on the subject of ecclesiastical subsidies, and I therefore submitted them as "acting appointments" in order to avoid placing any obstacle in the way of carrying out any instructions that your Lordship might be pleased to give in regard to that question. There is no reason now why these appointments should be still regarded as acting appointments, and I have the honour to request that they may be confirmed as permanent.

3. In the case of the Rev. Mr. Boyd, late Chaplain of Trinity Church, and now Chaplain of St. Peter's, no new interest in salary or pension will be created. In the case of the Rev. Mr. Koch, late Chaplain of Jaffna, now Chaplain of Trinity Church, his salary will be increased from Rs. 3,000 to Rs. 6,000, and his pension will be calculated accordingly. Both these gentlemen were already on the fixed establishment. The Rev. Mr. La Brooy, who has been appointed Chaplain at Jaffna at Rs. 3,000, has only held temporary appointments before, and this is his first appointment on the fixed establishment.

I have, &c.,
J. R. LONGDEN,
Governor.

No. 6.

Governor Sir J. R. LONGDEN, K.C.M.G., to the Right Hon. the EARL OF KIMBERLEY.
(Received March 10, 1881.)

Queen's House, Colombo, Ceylon,
February 21, 1881.

MY LORD,—I HAVE the honour to acknowledge your Lordship's Despatch of the 19th of November last,† conveying your decision upon the long-pending question of discontinuing the ecclesiastical stipends now paid from public funds in Ceylon.

2. I communicated your Lordship's instructions without delay to the Bishop of Colombo, and also to the principal Colonial chaplains of the Dutch and Scotch Presbyterian churches which are aided by the State.

3. There will, I apprehend, be no difficulty in giving effect to your Lordship's instructions. As regards the salaries at present borne on the fixed establishment, it will be necessary to amend the Civil List Ordinance, discontinuing the ecclesiastical establishment, but making provision for existing interests as authorised by the Despatch.

4. The churches and parsonage houses in Ceylon are not for the most part in the possession of the Government, but in that of trustees either appointed by virtue of the Ordinances named in the margin, or of special trust deeds, and are not generally maintained out of public funds. As directed in your Lordship's Despatch, these churches will not be interfered with. But there are other churches with respect to which I propose, after further conference with the Bishop, to submit, for your Lordship's consideration, special arrangements. Among these churches are, the Garrison Church of St. Peter's in the Fort at Colombo, which was originally a Government building, but was conveyed by deed to certain trustees for the Church of England, subject to reservations of free seats for the Military; and the Church of St. Paul in Kandy, which was built at the joint expense of the Government and the congregation, and is vested in trustees created by Ordinance, who are required, to provide sittings for the Military. In both these churches it will be desirable to preserve the rights now vested in the Crown.

11 of 1842.
1 of 1845.
13 of 1845.
12 of 1846.
5 of 1864.
22 of 1865.

5. The Bishop of Colombo has under consideration the important question of organizing a church body. I forwarded to him the papers enclosed in your Lordship's Despatch on this question, and have conferred with him upon it, but there has not yet been time for the members of the Church of England to arrive at a decision upon this point. The subject has been discussed very fully, and I do not doubt that a satisfactory mode of proceeding will shortly be submitted. At the present moment the Bishop is engaged accompanying the Bishop of Calcutta, who is now visiting in his capacity as Metropolitan the various churches of the Anglican Communion in Ceylon.

I have, &c.,
J. R. LONGDEN,
Governor.

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* Not printed † No. 4.

No. 7.

The Right Hon. the EARL OF KIMBERLEY to Governor Sir J. R. LONGDEN, K.C.M.G.

Downing-street, March 16, 1881.

SIR,—I HAVE the honour to acknowledge the receipt of your Despatch of the 31st of January last,* and to confirm the appointment of Mr. Boyd to be Colonial Chaplain of St. Peter's Church, Colombo, of Mr. Koch to be Colonial Chaplain of Trinity Church, Colombo, and of Mr. La Brooy to be Colonial Chaplain of Jaffna.

2. As some time may elapse before the Ordinance providing for the gradual discontinuance of ecclesiastical subsidies in Ceylon can be passed, I am of opinion that with regard to future vacancies, the five years of grace referred to in my Despatch of the 19th November† should date from the 1st of January last.

I have, &c.,
KIMBERLEY.

No. 8.

Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G., to the Right Hon. the EARL OF KIMBERLEY. (Received April 25, 1881.)

The Cottage, Nuwara Eliya, Ceylon,
March 28, 1881.

MY LORD,—I HAVE the honour to transmit herewith a memorial addressed to your Lordship by the Consistory of the Reformed Dutch Presbyterian Church at Wolfendahl in Colombo, having reference to the projected withdrawal of State grants from this among other churches in Ceylon, and praying for exceptional treatment for their church either by the continuance of the present grant or by means of a money vote, the investment of which would provide for the salary now drawn by their minister, Rs 4,500 per annum.

2. The Consistory of Wolfendahl, one of the most respectable communities in Ceylon, and whom it would unquestionably be the desire of Her Majesty's Government to treat with all possible consideration, base the request put forward by them upon two grounds: the Treaty obligations entered into by the British Government at the time of the capitulation of Colombo in 1796; and the poverty of the congregation attending the church, consisting mainly of Government and other clerks and their families.

3. As regards the latter point, I am unable to find sufficient justification for any exceptional treatment of this case, for not only are there many other congregations in Ceylon threatened with the same fate, who are poorer and less able to support by their individual contributions the ministrations of their churches, but the Wolfendahl Consistory is exceptionally favoured in having a large private endowment which it has already made use of, and will, doubtless, again utilise for the support of its clergy.

4. I have no reliable data as to the present value of this endowment, but find that in 1875 it amounted to Rs. 5,000 per annum, independently of incidental receipts and subscriptions by which the total income of the church, exclusive of the Government grant, was raised to Rs. 6,470.

5. The question of the obligations imposed by the terms of the capitulation of 1796 is, however, one which deserves serious consideration.

The Capitulation.

6. The Wolfendahl church is one which was built by the Dutch Government in 1749 as a place of worship for persons of all races belonging to the Dutch Presbyterian Church, and the terms of the capitulation relied upon by the Consistory are found in Art. 18 as follows:—

"The clergy and other ecclesiastical servants shall continue in their functions and receive the same pay and emoluments as they had from the Company."

7. In pursuance of this stipulation the Dutch clergy were continued in their functions until they voluntarily left Ceylon on the arrival in 1806 of the Dutch Commissioner, Mr. Frediger, with the cartel-ship "Bushoff" from Java, upon which the following minute was recorded by the Governor (Sir T. Maitland) in Executive Council:—

Sir T. Maitland's Minute.

"His Excellency produces a petition from the members of the Dutch Consistory, stating that all the Dutch clergy being about to proceed to Batavia by the present opportunity, the Divine Service could no longer be performed."

"His Excellency states, that conceiving himself bound by the articles of capitulation of this place to support the inhabitants in the free exercise of their religion, he has thought proper to grant to the Rev. Mr. Giffening an allowance of Rix Dollars 300‡ per month to induce him to continue in this Island. His Excellency adds that he has been

* No. 5. † No 4. ‡ Say Rs 225

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the more inclined to adopt this measure as it in fact causes no additional expense to His Majesty's Government, the sum of Rix Dollars 300 not exceeding what has hitherto been allowed to the Dutch clergy."

8. The petitioners are, apparently, not aware of this minute, but I have quoted it as forming an important factor in the political history of their Consistory. It will not escape observation that, but for the intervention of Sir T. Maitland, a practical termination would have been given to the effect of clause 18 of the capitulation through the departure in a body of the Dutch clergy of the various Consistories, as they were unwilling to remain upon the salaries received by them from the Dutch East India Company, and that a new arrangement in supersession of clause 18 may be said to have commenced when the salaries of all the clergy were consolidated in order to offer sufficient inducement to one of their number to remain at Wolfendahl.

Sir Emerson Tennent's Letter.

9. It appears that after the capitulation the Wolfendahl Church was used for services according to the English ritual for Natives who, or whose families, had previously belonged to the Dutch Church, in addition to the regular services of the original congregation, but disputes having arisen between the ministers of the two denominations, a resolution was passed at the close of the year 1846 by the Wolfendahl Consistory, that their church should no longer be available for English services.

10. The lengthy correspondence which thereupon passed will be found in the enclosures to Viscount Torrington's Despatch of the 11th October, 1850,* (ordered by the House of Commons to be printed on May 16, 1851, upon a motion by Mr. Tufnel), and great reliance is placed by the Consistory upon certain expressions contained in Sir E. Tennent's letter upon the subject, of 2nd March, 1847, referred to by them in the petition to the Legislative Council which is enclosed in their memorial. The passage is to the following effect :—"The British nation . . . . . took upon itself the payment of the same "pay and emoluments as they had from the Dutch East India Company, conditions which "have been faithfully observed to the present day."

Judgment of the District Court of Colombo.

11. The third document quoted by the Consistory is a judgment of the District Court of Colombo which was affirmed by the Supreme Court in appeal on July 8, 1873. The question before the Court was the validity of a bequest made to the Wolfendahl church by one Abraham De Silva, the legacy being disputed upon the plea, among others, that it was a bequest to a church, and, therefore, within the prohibitions of the Act of Mortmain.

12. The District Judge, in disallowing this plea, declared the Wolfendahl church to be in certain respects a public institution, and made use of the following expressions :— "Its peculiar and intimate relations with the civil power and with the States, before, at, "and since the British accession, make its legal rights stand (I repeat) on a basis remark-"ably distinct from those of any other religious community in the Maritime Provinces, "and are the special grounds of the present decision."

And again: "The functions of these Corporations (the Consistories) were guaranteed by Treaty. . . . . The British nation took upon itself the payment to them of the same pay and emoluments as they had from the Dutch East India Company."

Discussion in Legislative Council.

13. The last point relied upon by the Consistory is the terms of a discussion which took place in the Legislative Council upon the 10th November, 1875, when the sub-committee on the Supply Bill having recommended the disallowance of a vote proposed for fixing new windows in the Wolfendahl church, a motion was made by an unofficial member that the vote be retained.

14. The question was somewhat hotly debated, the main argument adduced in support of the vote being that the church was a public building which had been before and should again be maintained from public funds. The petitioners say: "In the course "of that debate the obligation by Treaty to maintain the clergy was admitted by almost "every speaker, the question raised referring only to the right to effect repairs to the "fabric as well;" and the Consistory quote an expression used by myself, "It was quite "true that in 1796 the capitulation was signed by which the Government undertook to maintain the clergy."

15. A not unimportant objection is, it should be observed, raised in the petition to the Legislative Council, that the Governor is prohibited by his instructions from assenting to any Ordinance, "the provisions of which shall appear inconsistent with obligations "imposed upon us by Treaty." For the salary of the minister of the Wolfendahl church being fixed by Ordinance, the discontinuance of that salary must of necessity receive legislative authorization.

16. It is not without some diffidence that I venture to lay before your Lordship my views upon the merits of this somewhat difficult question ; those merits appear to depend

* No. 1 of H. C. 303, May 1851.

upon two considerations. Firstly, has article 18 of the convention conferred upon the Wolfendahl Consistory an equitable claim to be paid the salary of their minister for all time?

17. It is open to argument whether the terms of this article—"The clergy shall "continue in their functions and receive the same pay and emoluments as they had from "the Company"—did not merely apply to existing office-holders, but perhaps the more equitable view may be to interpret the intention of this article as the assumption by the British nation of the responsibilities of the Dutch East India Company towards these Consistories, and the recognition of the Dutch Reformed Church as entitled to the same support and maintenance as the Established Church of the annexing country.

18. It can hardly even then be assumed that the Dutch East India Company did not possess the right of withdrawing, in due time and as a matter of policy, the grant which it had seen fit to confer, and while the withdrawal of that grant by the British nation as a matter of caprice or as an individual and exceptional step would appear to be open to a charge of unfairness, it appears reasonable to conclude that the right remained with the British, as it would have remained with the Dutch Government, to discontinue the grant upon grounds of State policy and upon the same broad and liberal basis as that which is to govern the discontinuance of such grants to our own Established Church.

19. Secondly, has any subsequent step of the Colonial Government so interpreted or modified the terms of the capitulation as to create a responsibility additional to and outside the provisions of clause 18?

20. I think not, but it will be more satisfactory to weigh, each by itself, the various considerations having reference to this second question, as enumerated in paragraphs 7 to 14, alone.

21. (*a*) Sir T. Maitland's minute.

In the first place, this minute does not appear to have been promulgated to the public, and, secondly, I cannot find that it goes beyond an acknowledgment of the obligation to give to the recognised public institution of the Dutch Church the same support and maintenance as was vouchsafed to recognised public institutions of our own Established Church. The remarks already made in paragraph 8 of this minute are, however, pertinent on this point.

22. (*b*) Sir E. Tennent's letter.

The avowed object of this letter was to support the proprietary rights claimed by the Wolfendahl Consistory in their edifice to the exclusion of other denominations, and the whole spirit of that letter appears to be intended as an assertion of the independent right of the Dutch Consistory to their edifice upon the same basis as that of a recognised Church of England. The expression quoted is, however, a strong one, and from the publicity and official sanction given to this letter, it appears to my judgment to be the strongest point in the case of the Consistory.

23. (*c*) I do not attach the same weight to the judgment of the District Court of Colombo, whose *obiter dicta* upon a question not before the Court could hardly confer a right which did not already exist. The only expression moreover in the judgment which bears with any force upon the point at issue is a mere quotation of the words of Sir E. Tennent's letter specially referred to in the preceding paragraph.

24. (*d*) Nor can I think that any support is given to the claim of the Consistory by the discussion in the Legislative Council of 30th November.. I append a copy of the official report of that discussion, and it will be observed that the main contention of Mr. Ferdinands, who, as it were, held the brief of the Consistory, was that no exceptional treatment in anticipation of disestablishment should be meted out to them, and there is no suggestion that in the event of disestablishment, the Dutch Consistory should be treated upon a different footing from the English Church.

25. Upon a review of the whole case, therefore, I cannot recommend that any recognition should be given to a claim by this section of Her Majesty's subjects in Ceylon to be dealt with on principles separate from those which are alone to be applied to their fellow-subjects who are similarly circumstanced, and from whose churches all State aid is about to be withdrawn upon definite conditions, and in compliance with a deliberate act of policy. The Dutch inhabitants of Ceylon had, for 10 years after the capitulation of Colombo, the fullest option coupled with ample opportunity of retiring from the Island, and returning to their own country, or one of its eastern Colonies. Many did so retire, and of the descendants of those who remained I may confidently assert that nothing could be more distasteful to them than any attempt to class them otherwise than as a most loyal portion of Her Majesty's subjects.

I have, &c.,

JOHN DOUGLAS.

ECCLESIASTICAL SUBSIDIES.

CORRESPONDENCE.

Enclosure 1 in No. 8.

To the Right Hon. the EARL OF KIMBERLEY, Her Majesty's Principal Secretary of State for the Colonies.

The humble Memorial of the Members forming the Consistory of the Reformed Dutch Presbyterian Church at Wolfendahl in Colombo, Ceylon.

SHOWETH,—1. That your memorialists form the governing body or trustees of the abovementioned church, and the Government of Ceylon have intimated to their chaplain that your Lordship has, by a Despatch dated 19th November, 1880, desired that the provision now made for ecclesiastical purposes from the public funds should be gradually withdrawn as vacancies occur in the offices of the present incumbents.

2. Your memorialists desire to place before your Lordship the exceptional *status* of the Reformed Dutch Church they represent in receiving State support, as distinguished from the Anglican and Scotch Presbyterian Churches. They feel assured that a full acquaintance with the origin and continuance of the grant to them would induce your Lordship to deal differently with their church.

3. The church in question was built by the Dutch in 1749, and upon the capitulation of Colombo a Treaty was signed on the 15th February, 1796, when it was stipulated, in reference to this and similar Dutch churches, as follows :—

Article 18. "*The clergy and other ecclesiastical servants shall continue in their functions and receive the same pay and emoluments as they had from the Company.*"

4. That this provision in the Treaty has hitherto been solemnly and strictly adhered to by the British Government by the payment of the salaries of the clergy of the Dutch Church, and the binding efficacy of this obligation has been expressly recognised by the Ceylon Government from time to time.

5. That in the year 1876, when an attempt was made by an unofficial member of the Legislative Council to stop the grants to all ecclesiastical bodies, your Lordship's memorialists presented a petition to the Council setting out their claims for exceptional consideration, and your memorialists beg to annex hereto a copy of the said petition, and pray your Lordship's earnest attention to the facts therein set forth, as if the same were embodied in this memorial.

6. That not only was the stipend to the clergy paid as an obligation under the Treaty, but the edifice itself was from time to time kept in repair by the Government as part of this obligation. On the 10th of November, 1876, an attempt was made in the Legislative Council to discontinue these repairs, when a discussion ensued as to the nature of the Treaty obligation in question. In the course of the debate Sir William Gregory, then presiding as Governor, said :—

"I found that in 1872, Rs. 2,989 were voted in the Supply Bill for the external plastering of the church and repairs to the roof, and I was certainly under the impression that a certain obligation exists binding the British Government to keep this fabric in repair. *I believe that this obligation was recognised and accepted by past Governors, and I think it is clearly set forth in a State Paper written by the desire of Sir Colin Campbell, in* 1847, *in which he points out that by the Capitulation* of 1796 the British Government granted the churches for Divine Service, and took on itself the same pay and emoluments they had from the Dutch."

* * * * * *

"I wish before putting the question clearly to show that the Government did not act lightly in this matter. As I said before, in 1872 the Supply Bill contained a vote for the whitewashing and repairs of this church. Having some demur in my mind as to the propriety of the vote I made enquiries, and was mainly influenced in sanctioning it by the passage in Sir Emerson Tennent's State Paper, written by desire of Sir Colin Campbell, which has been quoted by the honourable and learned member (the Hon. C. L. Ferdinands). I also referred to the clause in the Treaty of 1796, and it seemed to me that it was implied that the fabric should be maintained. It was there said :—The British nation (besides continuing the Dutch Church and clergy and other ecclesiastical servants in their functions) granted the chamber for the usual Divine service and took on itself the payment to them of the same pay and emoluments as they had from the Dutch East India Company. I understood the word 'chamber' clearly to belong to the buildings, and it seems that 'the pay and emoluments' must be read as being a substantiation of them and of the minister. I did not consult a lawyer on that point, but the vote of 1872 was unchallenged. I still think there is a moral obligation involved, and I shall give my own vote in support of the estimate."

In the course of that debate the obligation by Treaty to maintain the *clergy* was admitted by almost every speaker, the question raised referring only to the right to effect repairs to the fabric as well. The present Lieutenant-Governor (then Auditor-General) said "he should be sorry to advocate or support anything by which they would break faith "with so old and respectable a body as the Dutch community of Wolfendahl. . . . "*It was quite true that in* 1796 *the Capitulation was signed by which the Government under-* "*took to maintain the clergy*, but not the edifice of the Dutch Reformed Church. The Treaty was silent on that point."

On the division that took place the vote was carried by nine to six, the Council thus affirming the more liberal interpretation that the edifice (as well as the clergy) should be maintained at the expense of the Colony.

7. That your memorialists desire to point out that this church has a very large but a very poor congregation, consisting mainly of Government and other clerks and their families. Unlike the Anglican and other Missionary denominations here, they have no parent society in England or elsewhere to aid them, and they must stand or fall on their own resources. Sometime ago it was found that the State-paid clergyman could not attend to so large a congregation, and he was provided with an assistant at the expense of the congregation, but it was found that the payment to this assistant was an expenditure that the congregation could not stand, and his services had to be discontinued.

8. That the church supports from private charities bequeathed to it by two members of its congregation a large number of the poorer members of the congregation, and one consequence of the withdrawal of the present stipend to their clergyman would be the withdrawal of this support, which would place these poor families in great destitution, there being no poor law in Ceylon to meet such cases.

9. That your memorialists, for all these reasons, pray that Her Majesty's Government may not, to the detriment of so poor a community, overlook those Treaty obligations by which this community has been enabled to adhere to the church of their fathers, and to which they continue to be deeply attached, but that your Lordship would deal exceptionally with them in the proposed scheme for disendowment. The chaplain of the Wolfendahl Church is paid only 4,500 rupees per annum, a very insignificant sum in proportion to the total grants to the Anglican and other Presbyterian churches which it is proposed to abolish.

10. That if your Lordship considers that the endowment of this church should be discontinued if only for the sake of uniformity, your memorialists beg respectfully to suggest that this may be effected by a money vote (when the time for it arrives), the investment of which by your memorialists would secure the salary now drawn by the minister of the Wolfendahl Church.

And your memorialists, as in duty bound will ever pray.

S. LINDSAY, President Colonial Chaplain.
C. DICKMAN, Elder.
WM. E. GRATIAEN, Elder.
R. A. BROHIER, Elder.
J. H. EBELL, Elder.
JOHN WEINMAN, Deacon.
JAMES JANSZ, Deacon.
HENRY THOMASZ, Deacon.
E. R. LOOS, Deacon.
LEOPD. LUDOVICI, Deacon.
W. S. CHRISTOFFELSZ, Deacon.

Colombo, Ceylon, March 1881.

Copy Petition referred to in the Memorial.

To the Right Hon. the PRESIDENT and the Hon. MEMBERS OF THE LEGISLATIVE COUNCIL OF THE ISLAND OF CEYLON.

The humble Petition of the Members forming the Consistory of the Reformed Dutch Presbyterian Church at Wolfendahl in Colombo.

SHOWETH,—1. THAT the petitioners form the governing body of the above-mentioned Church and represent the largest congregation of any other Protestant Church in this Island, and they have learnt with much concern, that a petition is to be presented and a resolution to be brought forward in the Legislative Council, by an un-official member, recommending that the aid at present rendered by the Government towards the maintenance of the Episcopalian and Presbyterian Churches in the Island should be withdrawn.

2. That the petitioners feel it due to the Government and the interests in their charge to lose no time in placing before the Council the exceptional *status* of their church, in receiving State support, as distinct from all other churches in Ceylon in the same category.

3. That upon the capitulation of Colombo, by the Dutch, a Treaty was entered into on the 15th of February, 1796, when, in reference to the church in question and similar Dutch churches, it was stipulated as follows :—

Article 18. "*The clergy and other ecclesiastical servants shall continue in their functions, and receive the same pay and emoluments as they had from the Company.*"

4. That this Treaty has been solemnly and strictly adhered to by the British Government ever since, by the payment of salaries of the clergy of the Dutch Church ; the binding efficacy of it was never questioned, but expressly recognised by the Government from time to time.

ECCLESIASTICAL SUBSIDIES.

CORRESPONDENCE.

The Colonial Secretary in a letter to the Consistory of this Church, dated 2nd March, 1847, wrote as follows :—

"The British nation guaranteed to the inhabitants the exercise of the reformed religion as practised in the Dutch Church, promised the continuance of the clergy and other ecclesiastical servants in their functions, granted the churches for the usual Divine service, *and took upon itself the payment of the same pay and emoluments as they had from the Dutch East India Company,—conditions which have been faithfully observed to the present day.*"

That the relation of the Dutch Church with the State came incidentally in question very recently in the courts of this Island, and in a judgment pronounced by the District Court of Colombo in case No. 58,520, and affirmed by the Supreme Court on the 8th of July. 1873, this *status* is thus described :

Its peculiar and intimate relation with the civil power and with the State, *before, at, and since* the British accession makes its legal rights stand on a basis remarkably distinct from those of any other religious community in the maritime provinces."

The judgment proceeds :

"Recently under the English Government, in what must be considered as having the authority of a State Paper of considerable importance, communicating to certain memorialists the decision of Government on certain claims of Episcopalians to the Wolfendahl Church, the Colonial Secretary, by command of the Governor Sir Collin Campbell, writes as follows :—'Under the Dutch Government the *Established* form of 'Christianity, and the *only* form of Protestantism prevailing in Ceylon was the Dutch 'Reformed Church.' His Excellency then proceeds to give the following interpretation by his Government of the capitulation,—an interpretation which, though not judicial, commands all the authority of a State declaration. *The functions of these Corporations (the Consistories) were guaranteed by Treaty*, at the successive capitulations of Jaffna, Mannar, Colombo, Matara, and Galle; and their powers and authority have not only remained unaltered by any act of the British Government, but have been formally recognised in official intercourse from that time to the present. By the articles of those capitulations entered into between the English commanders and Dutch governors of the various forts, and subsequently confirmed by the Supreme authority, the British nation guaranteed to the inhabitants the free exercise of the reformed religion *as practised in the Dutch Church*, promised the continuance of the clergy, and other ecclesiastical servants in their functions, granted the churches for the usual Divine service, *and took upon itself the payment to them of the same pay and emoluments as they had from the Dutch East India Company*; conditions which have been faithfully observed to the present day, the rights of the Consistories of Galle, Matara, and Jaffna,* being equally respected with those in Colombo."

5. Your petitioners beg respectfully to submit that the petition referred to, and any resolution founded on it for disestablishment, is as much unconstitutional in point of law (so far as the Dutch churches are concerned) as it is wrong in principle, and that any such resolution, if adopted, would also be opposed to the spirit of Her Majesty's instructions to the Governor, dated 8th January 1872, which ordains :

Article 24. "You are not to assent in our name to any Ordinance of any of the classes herein specified ; that is to say,"

Section 6. "Any Ordinance, the provisions of which shall appear *inconsistent with obligations imposed upon us by Treaty.*

6. Your petitioners beg to refer the Council to a "fundamental axiom" laid down by Lord Mansfield in the case of Campbell *v.* Hall, I. Cowper's reports, as cited by Sir Edward Creasy, late Chief Justice of this Island, in his recent work "On the Constitution "of the Britannic Empire" as "a case which deserves to be studied and remembered as the "leading case in Colonial law."

Lord Mansfield held it to be a proposition too clear to be controverted :

"That articles of capitulation upon which the country is surrendered, and the articles of peace by which it is ceded, *are sacred and inviolable* according to their tone, intent, and meaning."

It would thus be seen that Ceylon, so far as the Dutch churches are concerned, stands politically in a quite different position from Jamaica and other Colonies where disestablishment has already taken place.

7. That, taking another view of the question, your petitioners beg to point out that if the treaty with them is to be set aside as regards their churches, in the same manner should the convention with the Kandyan people be disregarded. The petitioners respectfully submit that it would not be right in a Christian Government to set aside an engagement to uphold Christian Churches and to adhere to a like engagement for the maintenance of Buddhist temples and the Buddhist priesthood.

By Proclamation of 2nd March, 1815, it was agreed at a convention with the Adigars and Chiefs representing the Kandyan nation as follows :

---

* The capitulation of Jaffna, 28th September, 1785, Art. 13. Capitulation of Mannar, 5th October 1785, Art. 11. Capitulation of Colombo, 15 February, 1796, Art. 18.

Article 5. "The religion of Buddha professed by the Chiefs and inhabitants of these "provinces is declared inviolable, *and its rites, ministers, and places of worship are to be "maintained and protected.*" This proclamation was declared to be still of force on 12th January, 1870, when the new edition of the Ordinances was published, and has been observed to the present time by the *exemption from taxation of all the lands and endowments to Buddhist Temples* (by which the Buddhist faith is maintained and their priests supported), and by the like exceptional exemption from personal taxation of Buddhist priests.

By Proclamation of 21st November, 1811, section 21, it was again ordained:

"*The Governor, desirous of showing the adherence of Government to its stipulation in favour of the religion of the people, exempts all lands which now are the property of temples from all taxation whatever.* The lands so exempted being very extensive, the loss to the revenue by the exemptions, the petitioners believe, exceeds the subsidies now paid to the Anglican and Presbyterian ministers, and the petitioners respectfully submit that if it be considered unconstitutional or impolitic to violate the Kandyan Convention by withdrawing these exemptions from temple lands and Buddhist priests, it is equally so to violate the treaty of capitulation under which the maritime provinces of this Colony were acquired.

Your petitioners therefore humbly pray that the vested rights and interests of those Churches affected by the treaty of capitulation may not be prejudiced by any action that the Council may be disposed to take toward the disestablishment of other Churches in this Island; and your petitioners further pray that in the event of any petition being presented to this Council for disestablishment, or any action taken on it, that a copy of this petition may be forwarded for the information of Her Majesty's Secretary of State for the Colonies.

And your petitioners shall ever pray.

J. R. BROTCHIE, President., Col. Chaplain.
GEORGE B. RULACH, Scriba.
H. B. DE VOS, Elder.
R. A. BROHIER, Elder.
J. L. K. VANDORT, Elder.
W. E. GRATIAEN, Elder.
J. H. EBELL, Deacon.
C. W. SCHOKMAN, Deacon.
JAMES JANSZ, Deacon.
E. R. LOOS, Deacon.
H. E. THOMASZ, Deacon.

Colombo, 13th September, 1876.

No. 9.

The Right Hon. the EARL OF KIMBERLEY to GOVERNOR SIR J. R. LONGDEN, K.C.M.G.

Downing-street, June 14, 1881.

SIR,—I HAVE the honour to acknowledge the receipt of your Despatch of the 28th of March,* forwarding a memorial addressed to myself, and a copy of a petition addressed to the Legislative Council of Ceylon, from the Consistory of the Reformed Dutch Presbyterian Church at Wolfendahl in Colombo, praying that, in view of the intended withdrawal of all ecclesiastical grants in the Island, they may be treated exceptionally, either by the continuance of the present annual grant, or by the vote of a sum of money, the interest of which invested would provide for the salary now drawn by their minister.

2. The memorialists base their application on two grounds, viz., on the terms of Article 18 of the treaty of 1796; and, secondly, on the good work done by the community and their want of means to carry it on without assistance.

3. With regard to this latter argument, while gladly recognizing the good work in which the community is engaged, I have to observe that this plea might be urged with equal force by other religious bodies, and it is obvious that if such a plea were once admitted as a reason for not withdrawing the grants from the Wolfendahl Church, the present system must be maintained as heretofore, and the measure of disendowment be abandoned. I regret therefore that it is one which, in the present circumstances, it is not in my power to entertain.

4. I have, however, given my most careful consideration to the first ground on which the Consistory base their application, but after consulting the Law Officers of the Crown upon the legal aspects of the case, and after fully weighing the arguments put forward by the memorialists, I have come to the conclusion that the view which they urge cannot be

* No. 8.

ECCLESIASTICAL SUBSIDIES.

CORRESPONDENCE.

supported. It appears to me that the 18th article of the capitulation could not be deemed binding upon the British Government for all time and in all circumstances, even if the state of things which existed at the time of the capitulation had continued. But it seems that the Dutch clergy in 1806 voluntarily left Ceylon, and so discontinued the functions in consideration of which they had received and were to receive pay and emoluments. The grant made by Sir F. Maitland for the salary of the Rev. Mr. Giffening must be deemed to have been outside the capitulation, and capable of revocation at any time, subject only to the same consideration for existing vested interests as would be deemed just in the case of all the other religious communities. I have, therefore, to request you to inform the memorialists that I am unable to admit their claim to be exempted from the general measure of disendowment which is to be applied to other communions.

I have, &c.,
KIMBERLEY.

XV.—1881.

FURTHER CORRESPONDENCE

RELATIVE TO THE

COLOMBO HARBOUR WORKS.

(In continuation of Sessional Paper No. XXIII. of 1880.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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FURTHER CORRESPONDENCE

RELATING TO THE

COLOMBO HARBOUR WORKS.

HARBOUR WORKS.

CORRESPONDENCE.

DESPATCH from the Right Hon. the EARL OF KIMBERLEY to Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G.

Ceylon.—No. 254. Downing-street, 4th August, 1881.

SIR,—I CAUSED Sir James Longden's Despatch No. 204, of the 30th of October last, with its enclosures, respecting the proposals for the completion of the Colombo Harbour Works, to be referred to the Consulting Engineer. The communications which I have subsequently received from Sir James Longden and yourself upon the same subject have also been referred to Sir John Coode.

I have now the honor to transmit to you a copy of a letter from the Crown Agents, enclosing Sir John Coode's report on the matter, together with a copy of correspondence which has taken place with Sir James Longden and the Lords Commissioners of the Admiralty.

C. A., May 6, 1881, to Sir J. L., July 18, 1881.
Sir J. L., July 21, 1881, to Sir J. L., July 26, 1881.
Sir J. L., July 29, 1881.

I have only to add that I have thought it right, in anticipation of the consideration of these papers by your Government, to give to Sir John Coode the authority, requested in the last paragraph of his letter to the Crown Agents of the 25th of June, to proceed with the south-west breakwater on the line laid down in his reports of June, 1880, and March, 1881.

I have, &c.,
KIMBERLEY.

Enclosure No. 1.

The CROWN AGENTS to the UNDER SECRETARY OF STATE, Colonial Office.

Ceylon. Downing-street, London, 6th May, 1881.

SIR,—WITH reference to your letter of the 9th March, I have the honor to forward a copy of a report by Sir John Coode on the Despatches of the Governor of Ceylon, No. 204 of the 30th October last, and No. 63 of the 5th February last, relative to the design for the Colombo Harbour Works. In the opening paragraphs of this report Sir John Coode calls attention to the limit of expenditure, £800,000, which has been adopted for these works, and he refers to the rapid growth of the trade of the Port of Colombo during the past ten years as a consideration which would seem to justify the extension of this limit, which he clearly considers necessary if Colombo is to be provided with a harbour in which the usual operations of a great commercial port can be carried on without disturbance or interruption. Having recorded his views in this direction, he proceeds to examine the latest proposals made for the completion of the harbour, and to state what, in his opinion, is the most advantageous mode of applying the proposed expenditure.

31st March, 1881.

2. The schemes now under consideration are :—

(1) Sir John Coode's own design B. for a nearly close harbour with a north arm detached from the shore, and an entrance 600 feet wide in about 40 feet depth of water.

(2) Colonel Fyers' proposal for a single breakwater, having an arm turned somewhat to the north-east, and carried considerably further inshore than the end of Sir John Coode's proposed south-west arm, giving a depth of water at the entrance of about 37 feet.

(3) Captain Donnan's suggestion for a single arm, being simply an extension of Sir John Coode's proposed south-west arm.

3. Dealing first with these last two proposals, Sir John Coode points out that either of them could be constructed for the sum of £800,000, but that neither, nor indeed any single arm, however placed, would afford such protection from wave-disturbance as would enable the loading and unloading of vessels to be carried on in the harbour at all times. Either of them, he adds, would ensure the mere safety of vessels in the harbour,

HARBOUR WORKS.

CORRESPONDENCE.

and of the two proposals he gives the preference to Captain Donnan's, as affording as much protection as Colonel Fyers', with a greater depth of water at the entrance.

4. Sir John Coode next examines the objections which have been raised to his design B. by the commanders of large steamers calling at Colombo. Of these, the most important is, that the narrowness of the entrance of 600 feet width would make it necessary to enter the port at a speed which would prevent large and long steamers bringing up in the distance available for that purpose. After pointing out that the Master Attendant considers the position and dimensions of the entrance well suited to sailing vessels making the port, Sir J. Coode remarks that steamers entering at five miles an hour have half a nautical mile in which to bring up, and he asks how many ports can be found with equal capabilities in this respect In deference, however, to what may be considered the opinion of practical experts on this point, he proposes, in the first instance, to make the entrance 800 feet wide and to light both pier heads. Should it be found hereafter that the greater width of entrance is not necessary and gives rise to an inconvenient amount of sea disturbance within the harbour, it could easily be reduced. The other objections to the scheme appear to be satisfactorily disposed of by Sir J. Coode and to neutralize each other to a great extent.

5. Sir J. Coode next proceeds to consider whether the cost of design B. can be brought down to the limit of £800,000. By increasing the width of the entrance, and the distance of the shore end of the north arm from the land, and by the reduction of certain works which are desirable for the finish, but not for the stability of the breakwater, he reduces his estimate from £1,008,458 to £910,000. This must be regarded as the least sum for which a close harbour can be built.

6. It appears to us therefore that the question which has to be decided is, whether the future of the port of Colombo demands a harbour which will be merely a safe roadstead for ships, or one in which shipping operations can at all times proceed without interruption. The latter can be secured for an expenditure of £910,000, of which it is presumed that £250,000 will be obtained from the Public Works Loan Commissioners at 3½ per cent., giving an annual charge of £8,750 ; and the balance of £660,000, if borrowed in the market, will involve an annual charge for interest of £26,400, and for sinking fund £6,600. The charge to be borne by the port dues will be these two sums of £8,750 and £26,400 (sinking fund being charged to general revenue), making together £35,150, to meet which the prospective revenue of the port is estimated at £33,333, giving a deficiency of £1,817. Sir James Longden, in the 5th paragraph of his Despatch No. 204, assumed 4½ as the rate at which Ceylon could borrow, but the 4 per cents issued a year since are now at a nett price of 103¼, and there appears to be no reason for estimating the credit of the Colony at a lower rate than that indicated by the present value of its securities.

7. Assuming that Sir J. Coode's opinion settles conclusively the question of the class of design to be adopted, it would be matter for great regret if, for the sake of so comparatively small an annual saving as £1,817, Colombo should obtain merely a sheltered anchorage instead of a first-class commercial harbour. But it appears to us that there is every probability that even this inconsiderable deficiency will not occur, and that, as Sir J. Coode points out, full allowance has not been made for the future growth of the port. The prospective revenues of the port have been estimated at 400,000 rupees, and this estimate is, with one modification of no great importance, adopted from that furnished by the Chamber of Commerce in the appendix to their report of October, 1879 (Sessional Paper XIV. of 1879). That estimate comprises port dues, tonnage dues, and harbour and warehouse dues, but in each instance it is expressly stated that the figures are those for the year 1878, and no average appears to have been deduced from the past by which any increase beyond 1878 could be measured. Sir J. Longden, in the 6th paragraph of his Despatch already referred to, states that account has been taken of all the commerce passing Ceylon, and this is correct, inasmuch as the estimate allows for the probable diversion to Colombo of commerce which in 1878 went to other ports of Ceylon ; but for any subsequent growth of that commerce or of the commerce already belonging to Colombo, no allowance appears to have been made, and in view of the shipping returns of the last two years, which, although seasons of exceptional depression, show increases of 20,000 tons and 61,000 tons respectively as compared with 1877, no estimate of prospective port revenue can be regarded as complete which does not make reasonable allowance for the growth of trade. Possibly, as urged in the Governor's Despatch, the harbour may not of itself add a single ship to the traffic now passing Colombo, but the completion of the harbour will certainly not suspend the normal growth of traffic due to the expansion of the Colony's trade ; and to assume that that traffic will always remain what it was in 1878 is to suppose that the development of the Colony will cease from that date, and that its export and import trade will alike remain stationary. That it should do so, would be contrary to universal experience ; it must either increase or decrease, and if no account is to be taken of the former contingency, it would at least be prudent to provide for the latter by suspending all further expenditure, not only on the harbour but on railway extension and other public works which have their justification in the anticipation of a reasonable development of the producing power of the Colony.

8. The allowance which should be made for the growth of traffic beyond 1878 would be most safely ascertained by an average extending over a number of years large enough

to counteract the effects of abnormally good or bad seasons, and statistics are doubtless available for this purpose. Taking for present purposes the returns of the past ten years only, the average yearly increase in the total tonnages inwards and outwards is over 75,000 tons, and the average for the last five years over 80,000 tons, showing an increase not only considerable in amount but progressive in character. The Governor's estimate of 400,000 rupees for the port revenues is based on a total tonnage inwards and outwards of 1,228,332 tons, and an annual increase of only about 20,000 tons would produce in three years the additional amount of 21,600 rupees (£1,800) required to complete the annual charge entailed by Sir John Coode's design B. As this increase is less than one-third of the average of past years, and as the works will probably take considerably more than three years to complete, the adoption of design B., which it is now clear is the only one which satisfies the requirements of the present, while making reasonable provision for those of the future, does not seem likely to impose on the revenues of the port any greater charge than that which, on the most cautious calculations, they may be expected to become fully capable of bearing before the period of construction is completed.

9. The increase of the capital expenditure from £800,000 to £910,000 will necessarily impose a greater liability for sinking fund contributions on the general revenue to the extent of £1,100 a year; but it is doubtful whether this liability will ever assume the form of an actual charge. If the average growth of the trade of Colombo during past years (namely, 75,000 tons) is fairly maintained in the future, the port revenues three years hence will be, not the 421,000 rupees required to meet the interest charge, but more nearly 472,000 rupees, leaving a balance of 51,000 rupees over and above the interest charge, as a contribution towards sinking fund, and in each succeeding year the whole of the increase in the port revenues due to growth of traffic will become available for the same purpose.

10. The forecast which we have thus made of the financial future of the port of Colombo appears to us to afford no sufficient reason for adopting either of the single arm designs, which, while securing less complete shelter, can never—even by the addition of a north arm hereafter—give a harbour having the same depth of water at the entrance as design B.; the addition of a north arm to them would moreover make their final cost greater than that of design B., and we therefore feel justified on all grounds in endorsing the recommendation of this latter design, which Sir John Coode, after a careful examination of all that has been urged against it, and in the light of the results of the most recent observations of the local conditions, is still prepared to support with the full weight of his professional responsibility.

I have, &c.,

M. F. OMMANNEY.

[The Despatches from the Governor of Ceylon, No. 4 of 13th October, 1880, No. 6 of 6th January, 1881, and No. 63 of 5th February, 1881, are herewith returned.]

Sub-Enclosure in Enclosure No. 1

Sir JOHN COODE to the CROWN AGENTS for the Colonies.

5, Westminster Chambers.
London, S.W., 31st March, 1881

Colombo Harbour.

GENTLEMEN,—ADVERTING to your letters of 14th December and 12th instant, covering Despatches from the Governor of Ceylon with reference to the final design for the Colombo Harbour, I have now the honor to submit the following report.

No. 204, 30th Oc. 1880. No 63, 5th Feb. 1881.

2. I may here premise that the technical and other points in connection with these works have been so fully, and I may say so frequently, described at length in previous reports and documents, that it will be unnecessary again to go over this ground to a greater extent than is required to make my conclusions clearly understood. Whilst, however, the remarks I now have to offer will, under these circumstances, be brief, I desire to state that the recommendations herein made have been arrived at after prolonged investigation and a careful and mature re-consideration of the whole question.

3. Sir James Longden states, in his Despatch of 30th October, that the decision of the Legislative Council, that the expenditure upon the harbour works is not to exceed £800,000, must be accepted as final. This, I would beg respectfully to submit, is a subject for regret, seeing that the above limitation has been determined by computing the revenue to be derived from the new harbour upon the basis of the trade of Colombo during the year 1878, the last half of which, according to the report of the Chamber of Commerce, was "a period of great depression." Moreover, no allowance appears to have been made for future increase in the tonnage of vessels frequenting the port, which will undoubtedly produce an expansion of the harbour revenue, the growth during the last decade, as appears

Limitation of expenditure to £800,000

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from the returns certified by the Collector of Customs, having been no less than 170 per cent. The following table is instructive as showing the progressive strides which this port has made since the opening of the Suez canal :—

Year.		Tonnages entered inwards and cleared outwards	Year.		Tonnages entered inwards and cleared outwards
1869	..	446,110	1875	...	943,818
1870	...	510,995	1876	...	1,051,175
1871	..	596,381	1877	...	1,145,295
1872	...	656,759	1878	...	1,165,417
1873	...	739,952	1879	...	1,205,940
1874	..	805,718			

4. Although, until the harbour loans are extinguished, the Colony will, as Sir James Longden has pointed out, be called upon to bear the sinking fund of 111,000 rupees in addition to the temporary loss of 90,000 rupees of port dues now paid to the Treasury, yet, when the loans shall have been paid off, the Colony will be handsomely recouped for these annual debit charges of 201,000 rupees by the port dues, which I venture to believe will, at no very distant date, be considerably in excess of 400,000 rupees.

Colonel Fyers' proposal

Plan D. accompanying Despatch No 204 of 1880.

5. Doubtless with a view to facilitate the final decision of the harbour question, the Surveyor-General, Colonel Fyers, R.E., has suggested a modification in the line and length of the outer portion of my south-west breakwater, in order to bring the total expenditure within the sum named. He has shown on a plan the modified line embodied in his suggestion ; this plan has been laid before the Council, and exhibited to several captains of steamers visiting the port, and it is desired I should report thereon.

6. There are some commendable features associated with Colonel Fyers' suggestion. First, it could probably be completed for somewhat less than £800,000. Second, it would afford a not inconsiderable area of shelter and fairly quiet water (although not, in my view, sufficient immunity from "run" or range) during the south-west monsoon, and also during the north-east monsoon, when the direction of the swell is westward of N.N.W. It would, however, provide only a limited area of partial shelter when 'long-shore winds prevail of the character experienced during the early part of the present year, when the direction of the swell was about due north for five days in the mouth of January, and from north to north-west for seven days, the height of the wave undulations varying from 2ft. 6in. to 5ft. 6in. It is necessary, however, for me to state in connection with the latter observation, that it is absolutely impossible to provide by a single arm, however placed, such protection as ought to be afforded, for although, as pointed out in my report of June of last year, the *safety* of shipping in the harbour would not be jeopardized in the slightest degree by such a wave-disturbance as would be likely to arise if the work were executed on the line suggested by Colonel Fyers, there cannot, nevertheless, be a doubt that in the discharging, loading, and transhipment of cargoes, much inconvenience would be experienced, nor could the area of the harbour be utilized by anything like the same number of vessels at one time as would be the case if perfect shelter were afforded from all quarters.

7. This modified line would not, in my opinion, be nearly so advantageous as an extension of the south-west breakwater of Design B., which would be executed at about the same cost. It would not afford such a depth in the entrance as the latter—a matter of vital moment having regard to the rapid growth in the size of ocean steamers in the present day ; nor would it be so well placed for combination, hereafter, with a northern arm ; I cannot, therefore, recommend that the modification suggested by Colonel Fyers should be adopted.

Opinions of commanders of steam ships and latest report of Master Attendant

8. I now come to the report of the Master Attendant, Captain Donnan, dated 31st January, transmitting the opinions upon the harbour question of the commanders of several steamers.

9. As stated by Captain Donnan, seventeen of these are in favour of a single breakwater with outer end curved to the north-east, and only three are in favour of Design B. Briefly stated, the objections of the commanders to Design B. are as follows :—1st, that the proposed entrance is narrow, and would be difficult and dangerous to make, and could not be taken at night during the south-west monsoon ; 2nd, that vessels would have to enter at too much speed to admit of their being safely brought up ; 3rd, that the opening would admit considerable sea ; 4th, that the Issaure ledge fronts the entrance ; and 5th, that the harbour would be a stagnant pool.

10. As to the first point : I may observe that the entrance as laid down in Design B. is 600 feet in width or rather more than *fourteen* times the beam of the *largest* steamer in the fleet of the Peninsular and Oriental Company, but, as pointed out in my report of 16th June last, if experience should show, when the two arms are drawing towards completion, that a greater width is desirable, the entrance could be increased by curtailing the length of the north arm. To meet the apprehensions expressed by the commanders, the width, in the first instance, might be taken as 800 feet, but I feel assured experience will prove the desirability of reducing this width, and that 600 feet will be found ample for all purposes. It must be borne in mind that, in order to afford the fullest practicable amount of shelter, it would be necessary to keep the entrance as narrow as possible consistent with

freedom of ingress and egress. I had intended to arrange for a powerful light on the head of the south-west arm alone; a similar light might, however, be placed on the head of the north arm also; these together would render the entrance perfectly accessible by night as well as by day. There could be no possible danger in "making" the entrance between the two pier heads thus lighted, if placed in the depth of water and relative positions proposed. With regard to the aspect of the entrance, Captain Donnan has stated it to be the best that could be devised to suit sailing vessels during both monsoons.

11. As to vessels having to enter at too much speed to admit of their being safely brought up, I may observe that taking the speed when between the pier heads at five miles an hour, there should be no difficulty whatever in bringing up the largest steamer within half a nautical mile, which is the distance from the entrance to the central portion of the area where vessels of that class would lie. If a large steamer cannot be safely brought up in such a harbour as that indicated in Design B., it may well be asked—What room is required for the purpose, and how many ports are there to be found with greater, or even as great, capabilities in this respect?

12. With regard to the third point, viz., that the opening would admit considerable sea, it may be stated that the more the direction of the entrance to any harbour coincides with that of the heaviest waves, the more easy will it be to make; therefore, the objections of the commanders that the entrance to Design B. would be difficult to make, and at the same time that it would admit considerable sea, are contradictory. As a matter of fact, I arranged the entrance so that it should comply, as far as practicable, with *all* the conditions. I might have designed it to have been less open to the sea, but in that case it would not have been so easy of access as at present proposed. Even with an 800 feet entrance, waves of ten feet high, which may be taken as exceptionally heavy for Colombo, and only experienced occasionally during the south-west monsoon, would cause an undulation of not more than eighteen inches in that part of the harbour where the large steamers would lie. With a six-feet wave in the entrance, which is of more common occurrence, the undulation where the large steamers will be moored would be only about twelve inches. Nearer to the shore, where the smaller vessels and boats would lie, the undulation would practically disappear.

13. As to the Issaure ledge fronting the entrance, there cannot possibly be any valid objection on this score, seeing that the depth over the whole of that portion of the ledge which could, under any circumstances, be regarded as "fronting" the entrance, would have 42 feet and upwards over it at low water of lowest tides. Moreover, the portion of the Issaure ledge referred to is practically level with the sand. The objection doubtless originated from the prominence given to this ledge on the lithographed plan marked D., prepared in the Colony and exhibited to the commanders.

14. The final allegation, that the harbour would be "a stagnant pool," was dealt with, and I submit fully met, in the 17th paragraph of my report of June last. The statements, on the one hand, that the opening would admit considerable sea, and, on the other, that the harbour would become a stagnant pool, are altogether irreconcilable, and may be dismissed accordingly.

15. Captain Donnan in his latest report, when transmitting the opinions of the commanders, expressed his own views thus:—"Although I have supported Colonel Fyers' plan of breakwater in preference to either of the two proposed close harbours, yet, the longer I consider the harbour question, the more I am strengthened in the opinion I expressed in my letter No. 68 of the 25th July, 1879, that an extension of Sir John Coode's breakwater to the point where he proposes to have the western end of his northern arm, would be the best plan to adopt." Captain Donnan adds, that an extension of the south-west breakwater of Design B. for 600 to 1,000 feet in a north-east direction would be "all that is needed to give the requisite amount of shelter, and concludes by stating that in any case it would be a matter for regret if an additional £50,000 to £100,000 were to stand in the way of making a first-class harbour at this port." Of course the favourable opinions which the commanders have expressed of Colonel Fyers' modified line would apply also to the proposal of Captain Donnan in the report above alluded to, as will be seen upon referring to the accompanying drawing, whereon the modified line suggested by Colonel Fyers and the extension proposed by Captain Donnan are shown.

Recommendations.

Design B recommended as preferable.

16. The question now narrows itself into the determination whether Design B., including the north arm, shall be sanctioned forthwith, or whether the south-west breakwater of that design shall be extended 600 feet, deferring the execution of a north arm until it may be considered desirable to undertake that work.

17. My own views as to the necessity for a northern arm have already been set forth in the reports of September, 1878, and June, 1880, and nothing has transpired since these reports were written to induce a change in those views, but, on the contrary, the 'long shore winds of the present north-east monsoon have strengthened my previous conclusions on this important point.

18. In criticizing design B., due weight has not been given to the immense advantages which would be afforded by the works contemplated under this design, in providing complete shelter during *all* winds and in *all* states of the sea, so that the loading and

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discharging of steamers, and the general traffic of the port may be carried on with convenience and without interruption in every part of the new harbour. I do not hesitate to say that these desirable objects cannot be so effectually accomplished by *any* single sheltering work, however extended it may be.

19. As will be evident from the plans, it cannot be reasonably argued that anything like the same area of sheltered water, or such complete protection, or such a satisfactory depth in the entrance, can be given by a prolongation of the south-west breakwater as would be afforded by Design B. I venture to submit that the objections to that design have been hereinbefore satisfactorily disposed of.

20. In a matter of such moment it is, of course, of the greatest importance that all points should be duly considered; in this case the arguments "*pro.* and *con.*" have been fully discussed, but I fail nevertheless to discern that any valid objection has been raised which should preclude the adoption of Design B., unless it be that its estimated cost is in excess of the sum named for the outlay on the harbour.

21. Looking at the undoubted advantages which this design would afford, I have anxiously considered how far it may be possible to reduce the first cost of it, in order to comply, as far as practicable, with the limitation of expenditure which has been arrived at in the Colony. By making the north arm 2,000 feet long instead of 2,500 feet as previously proposed, the entrance being 800 feet in width instead of 600 feet, and by omitting, for the time, the concrete capping along that portion of the breakwater northward of the termination of the harbour wall, a length of 2,870 feet, the estimate would stand as follows:—

	£	£
Nett cost of south-west breakwater, completion of root, depôt wharf, &c., dredging (including purchase of plant), and reclamation, as in report of June, 1880, after allowing credits for value of plant and of reclaimed land	— ...	777,593
Assuming saving on cost of south-west breakwater	50,000	
Saving by omitting capping to outer portion of south-west breakwater...	15,000	
		65,000
		712,593
North arm 2,000 feet in length, instead of 2,500 feet as previously proposed		198,046
Nett cost of Design B		910,639

22. In the above estimate I have taken into account the probable saving arising from the very rapid progress which has recently been made with the setting of the breakwater, which may be anticipated to continue, provided the coming setting monsoons are not exceptionally unfavourable.

The omission of the capping would not affect the security of the breakwater, although the finished road surface which it would afford would not be available. This capping could, of course, be added at any future time if considered desirable.

23. I put forward the execution of Design B., as above described, with the most entire confidence that it would hereafter be found to be far more satisfactory in the interests of the Colony than either of the alternative suggestions, and I trust that the addition of the £110,000 required for its execution over and above the sum of £800,000, will not be considered an insuperable barrier to its adoption.

Alternative proposal. Extension of south-west breakwater

24. If, notwithstanding the above recommendation, it should be decided that the expenditure shall, under no consideration, exceed £800,000, the only course to adopt will be to carry on the south-west breakwater on the line, and for the full length, proposed in Design B., extending it 600 feet in a north-east direction or thereabouts, as suggested by Captain Donnan. A single arm of this extent would give practically the same shelter during both monsoons as a work on the modified line suggested by Colonel Fyers, with the great advantage that it would afford deeper water in the entrance, and admit of the ultimate formation of a more perfect harbour when combined with a north arm, which, if not sanctioned now, will certainly be required hereafter. I should not be prepared, at all events for the present, to support an extension of this breakwater for 1,000 feet, as alluded to by Captain Donnan, seeing that the entrance would be thereby removed so far to the north-east as to be placed in water of a less depth than is desirable. Even with an extension of 600 feet, the depth in the entrance would not be so great as in the case of Design B. In order to provide for steamers of the future, not less than 38 to 40 feet of depth at low water ought to be available in the entrance; this would be secured by the 600 feet extension of the south-west arm, but better still by Design B.

25. I estimate that allowing, as before, the saving on the cost of the breakwater, and the omission of the capping, the nett cost of the works, including an extension of 600 feet, the dredging, reclamation, and completion of depôt wharf, would be about £800,000; but, as I have before said, neither this, nor any other single arm, would afford such shelter and accommodation as, in my view, ought to be provided at Colombo.

Question of necessity for occasional dredging, if Northern Arm omitted.

26. With respect to the possible need for periodical dredging if the northern arm were not executed, and with regard to the result of the examination bearing on this

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Despatch No. 8, 1881.

subject which has just been made, as mentioned in a recent Despatch from His Excellency the Governor of Ceylon to the Secretary of State, I am pleased to find that this examination has proved satisfactory. At the same time, it is incumbent upon me to point out that it would be premature as yet to draw a final conclusion, seeing that the conditions at the present time are in some degree different from those which will exist when the intended deepening (lately commenced) has been completed, and the south-west arm has been carried out to its full extent—always supposing the northern arm to be omitted; but, however this may be, the result up to the present is certainly so far encouraging. Further experience can alone definitely determine the matter in question. I should explain however that the possible dredging, if required, would not be a matter of great importance.

Value of Convict Labour.

27. As regards the remarks in my report of 16th June last, on the value of convict labour, I felt it to be my duty then to call attention to the statements in reference to this subject contained in Mr. Kyle's report of progress for the year 1878, and I suggested it seemed to me to be only reasonable and proper, that the cost of the works should not be augmented by the employment of convicts upon them. It is satisfactory to note that Sir James Longden fully concurs in this view, and proposes a method which cannot, I think, fail to meet the case in a manner that will prevent all further questions on this point, viz., that in lieu of a charge for convict labour per diem, the Harbour Works shall be debited with the labour of the convicts according to a scale to be framed on the basis of the quantity and value of work executed by free labour. I assume, as a matter of course, that this schedule of rates will be such as the Resident Engineer of the Harbour Works, Mr. Kyle, can concur in as fair and equitable.

Despatch No 6, paragraph 5

28. I beg to return the several documents received with your letters of 14th December, 1880, 25th and 26th February, and 12th instant, with their respective enclosures.

No. 204, 30th October, 1880
No. 6, 6th January, 1881.
No. 8, 7th January, 1881.
No. 63, 5th February, 1881.

I have, &c.,
JNO. COODE.

Sub-Enclosure No. 2 in Enclosure No. 1.

Sir JOHN COODE to the CROWN AGENTS for the Colonies.

5, Westminster Chambers, London, S.W.,
25th June, 1881.

Colombo Harbour.

GENTLEMEN,—WITH regard to your enquiry whether additional expenditure would be incurred by postponing a decision as to the adoption of the north arm until after the expiration of one, or it may be two seasons from the completion of the south-west breakwater, I have to observe that the proper time to commence the north arm will be immediately upon the completion of the rubble deposit forming the mound of the south-west breakwater. If the intervening seasons are not unfavourable, this mound may be expected to be completed about twelve months from this time, or very soon thereafter. It is desirable that the preliminary preparations for the provision of certain special block-setting plant should be made in anticipation of the commencement of operations on the north arm, consequently a decision as to the ultimate design for this work should be arrived at as early as practicable. The adoption of this course would be more economical than if the commencement of the north arm were deferred for one or two seasons after the south-west breakwater has been completed, seeing that practically the same engineering and office staff, with additional foremen, would suffice for both works. The most important advantage, however, in favour of the commencement of the north arm at the time I have suggested lies in the fact that the existing barges and depositing plant would be kept steadily employed without break, and also, and more particularly, that the experienced staff of European overseers now employed on the south-west breakwater would be available for the north arm, which would not be the case were an interval of one or two seasons to elapse from the completion of the breakwater before the latter work were co mmenced, during which period no suitable occupation could be found in the Colony for these men.

I shall be glad to receive authority, previous to next mail, to proceed with the south-west breakwater upon the line laid down in my reports of June, 1880, and March, 1881. As already mentioned to you verbally, the Acting Resident Engineer will be looking at an early date for my instructions in this respect, in order that a sufficient length of seasoned mound may be available to receive the superstructure of concrete blocks during the next setting monsoon. The decision of *this* point does not of course affect the north arm.

I have, &c.,
JNO. COODE.

HARBOUR WORKS.

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Enclosure No. 2.

The Hon. R. H. MEADE to Governor Sir J. R. LONGDEN, K.C.M.G.

Downing-street, 18th July, 1881.

SIR,—I AM directed by the Earl of Kimberley to transmit to you a letter from the Crown Agents, enclosing further reports from the Consulting Engineer in regard to the different proposals for the completion of the Colombo Harbour Works.

Lord Kimberley wishes you to consider these reports, and state to him whether you think that, looking to the strong opinion of Sir John Coode, it would be unwise to proceed with either of the schemes suggested by the Surveyor-General and the Master Attendant, and if so, whether the instructions requested in the last paragraph of Sir John Coode's letter of 25th June might, in your opinion, be given at once in anticipation of the transmission of the papers to the Colony and the acceptance of the latest scheme by the Colonial Government.

I am, &c.,

R. H. MEADE.

Enclosure No. 3.

Governor Sir J. R. LONGDEN to the COLONIAL OFFICE.

9, Great Cumberland Place,
21st July, 1881.

SIR,—I HAVE the honor to acknowledge the receipt of your letter of the 18th instant, transmitting a letter from the Crown Agents enclosing a further report from the Consulting Engineer in regard to Colombo Harbour Works, and desiring me to state whether I think that, looking to the strong opinion of Sir John Coode, "it would be unwise to proceed with either of the schemes suggested by the Surveyor-General and the Master Attendant, and, if so, whether the instructions requested in the last paragraph of Sir John Coode's letter of the 25th of June might, in my opinion, be given at once in anticipation of the transmission of the papers to the Colony and the acceptance of the latest scheme by the Colonial Government."

I am bound to say, that in presence of the enclosed report I think that it is impossible to press further the adoption of either of the schemes proposed by the Surveyor-General or the Master Attendant, and that the instructions requested in Sir John Coode's letter may at once be given.

It is the desire of the Legislative Council and of the Colony generally that the harbour works should be carried out, whether by a single arm or by two arms, as to provide within the harbour "complete shelter during all winds and in all states of the sea." This is the paramount object, and as the ablest Engineer of the day, after a thorough examination of the question and with the advantage of a personal knowledge of the place, declares emphatically that this object *cannot* be "effectually accomplished by *any single sheltering work, however extended* it may be," the construction of a north arm must, I fear, be accepted as a necessity, notwithstanding that the cost exceeds by £110,639 the limit of £800,000 fixed by the Legislature last year as the highest amount which the anticipated revenues of the new harbour would justify. The additional charge that will be thrown upon the Colony will be £5,500 (or say 66,000 rupees) per annum, which will have to be defrayed from the general revenue until the commerce of the new harbour expands sufficiently to yield a revenue equal to the charge.

See Sir J Coode's report, paragraph 11.

With respect to the important question which has been brought forward by the Master Attendant of Colombo, as to steamers being obliged to enter the harbour at too high a speed to admit of their being brought up in safety, Sir John Coode asks, "What room is required for the purpose, and how many ports are there to be found with greater or even as great capabilities in this respect?" No doubt many harbours have narrower entrances, and afford less room inside, than the new harbour at Colombo, but vessels are usually able to enter such harbours at low rates of speed—one or two miles an hour—while it is apparently conceded that, on account of the force of the waves outside, steamers must enter Colombo harbour at the rate of five miles an hour, and once inside they "have half a nautical mile" to bring up in. Whether this is sufficient appears to be a question of practical seamanship, and so much importance has been attached to it by the Master Attendant at Colombo that I would venture to suggest for the consideration of the Earl of Kimberley that the opinion of the Admiralty should be sought upon the point before the question of the width of the entrance be finally settled.

See report.

I have, &c.,

J. R. LONGDEN.

P.S.—I return the enclosures in your letter: namely, Letter of Crown Agents, 6th May, 1881. Report of Sir J. Coode, 31st March, 1881. Letter from Sir J. Coode, 25th June, 1881.

Enclosure No. 4.

The COLONIAL OFFICE to Sir J. R. LONGDEN.

Downing-street, 26th July, 1881.

SIR,—I AM directed by the Earl of Kimberley to acknowledge the receipt of your letter of the 21st instant, on the subject of the completion of the Colombo Harbour Works, and to state that His Lordship has, in accordance with your suggestion, caused a communication, of which a copy is enclosed, to be addressed to the Admiralty in regard to the possibility of large steamers entering the proposed harbour during the south-west monsoon, and drawing up with safety. You will observe that Lord Kimberley has suggested that you should confer with the technical advisers of the Admiralty on this matter, and I am to request that you will place yourself accordingly in communication with that Department.

I am, &c.,

R. H. MEADE.

Enclosure No. 5.

The COLONIAL OFFICE to the ADMIRALTY.

Pressing. Downing-street, 26th July, 1881.

SIR,—I AM directed by the Earl of Kimberley to request that you will lay before the Lords Commissioners of the Admiralty the accompanying plan, showing the latest proposals of the Consulting Engineer (Sir John Coode) in regard to the completion of the Harbour Works at Colombo.

Grave doubt has been expressed in various quarters as to the possibility of a large steamer, entering the proposed harbour with the beam wind of the south-west monsoon, being able to bring up sufficiently quickly to avoid running aground or coming into collision with other large vessels already lying in the harbour. The Lords Commissioners of the Admiralty will observe from the passage quoted in the enclosure to this letter, that Sir John Coode is not apprehensive of any difficulty in this respect, but the question is one of such extreme importance to the future of the port of Colombo, that Lord Kimberley would be much obliged if the Lords Commissioners would obtain and favour him with the best professional opinions on the matter at their command.

Paragraph 11 of Sir J. Coode's report of 31st March, 1881.

As it is desirable to issue early instructions as to the prosecution of the works, Lord Kimberley would be glad to have an answer to this letter with as little delay as possible.

It will probably be satisfactory to Sir James Longden, the Governor of Ceylon, who is at present in this country, to have an opportunity of discussing this matter with the technical advisers of your Department, and he has accordingly been requested to call at the Admiralty with a view of being placed in communication with them.

I am, &c.,

R. H. MEADE.

Enclosure No. 6.

Sir J. R. LONGDEN to the COLONIAL OFFICE.

9, Great Cumberland Place, W.
29th July, 1881.

SIR,—I HAVE the honor to acknowledge your letter of the 26th instant, relative to the Colombo Harbour Works.

In accordance with the arrangement therein proposed, I called yesterday at the Admiralty, and by the kindness of Admiral Sir A. Cooper Key I had the opportunity of discussing with him and the Hydrographer the important question raised by the Master Attendant of Colombo harbour as to the practicability of long steamers such as those of the Peninsula and Oriental and Messageries Maritimes Lines entering the new harbour at Colombo at a speed of four or five miles an hour, and bringing up within the half mile available for them.

After full consideration, Sir A. Cooper Key and the Hydrographer concurred in opinion that there was no such practical difficulty in steamers bringing to within the available space (the water being smooth) as would make it necessary to abandon the north arm, which they both thought necessary to ensure still water in the harbour.

The plan before us at the discussion showed the entrance at the increased width of 800 feet, which Sir John Coode has lately proposed, instead of 600 feet, and an opinion was expressed that the entrance should not be less than 800 feet in width.

I have, &c.,

J. R. LONGDEN.

XVI.—1881.

SUMMARY OF STEPS

TAKEN FOR

THE FORMATION OF A VOLUNTEER REGIMENT FOR CEYLON.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

SUMMARY OF STEPS

TAKEN FOR THE

FORMATION OF A VOLUNTEER REGIMENT FOR CEYLON.

FORMATION OF A VOLUNTEER REGIMENT.

SUMMARY OF STEPS TAKEN

On the 28th February, 1881, a petition purporting to emanate from 176 persons of Colombo, who expressed their willingness to form themselves into a Corps, and to submit to the provisions of Ordinance 3 of 1861, was received by the Governor.

Subsequent petitions from Colombo from 11 persons, and from Kandy from 96 persons, were received.

On the 1st April, 1881, the Lieutenant-Governor signified his consent by notification in the *Gazette*, and on the 13th April, 1881, a public meeting was held in the Council Chamber under the presidency, of the Hon. R. Cayley, Chief Justice, for the purpose of selecting a Committee to compile rules, and electing a Commanding Officer. The meeting elected Mr. J. S. Armitage, whose appointment was gazetted on the 3rd May, 1881.

A deputation consisting of Mr. J. S. Armitage, the Commanding Officer, and Messrs. Bosanquet, Ferdinands, Elliott, Boake, and Collum, having had an interview with the Colonial Secretary, the following concessions were made by Government:—

1. The grant of an annual allowance of 50 rupees for each efficient field officer, 30 rupees for each efficient officer other than a field officer, 20 rupees for each efficient non-commissioned officer and private
2. The supply by Government of arms to the Volunteers.
3. The advance by Government of the sums required for uniform; these advances to be repaid by the Corps from the annual allowance in five equal annual instalments.
4. The provision by Government of a building for an Armoury and Store, Orderly Room, and quarters for Armourers at Colombo.
5. The payment by Government of an Adjutant and Drill Instructors.
6. The supply by Government of 10 rounds blank and 60 rounds ball ammunition per man per annum.

A supply of long Snider Enfield rifles and accoutrements has been ordered by the Government; 250 from India, 750 from London

The Government has advanced 8,500 rupees for uniform and 2,000 rupees for general purposes to the Volunteers, on terms of repayment.

The Government has provided the old Merchant Seamen's Hospital in the Pettah for the head-quarters of the Volunteers, repairing it at a cost of 1,000 rupees, and providing an additional sum of 1,500 rupees for arm-racks, magazine, and further repairs.

The Government has consented to pay the following sums for an Adjutant:—salary, 2,400 rupees per annum with consolidated allowances at 2,100 rupees, and forage allowance 500 rupees; total 5,000 rupees; to include lodging and all other allowances except allowance for travelling, if required; and the following sums for staff, viz.:—Sergeant-Major 3*s.* 9*d.* per day, Quartermaster-Sergeant 2*s.* 7*d.* per day, Armourer-Sergeant 2*s.* 7*d.* per day, 7 Drill Instructors at 2*s.* 7*d.* per day, and one Drill Instructor at 1 rupee per day.

The Government has also arranged for a rifle range to be used by the Police and Volunteers near the railway line at Hunupitiya, and for the Volunteers travelling there and back at single rates, as well as for the free transmission by post of correspondence on the subject of Volunteers.

The rules for the regiment have been prepared and are undergoing revision.

A Draft Ordinance to harmonize Ordinance 3 of 1861 with the Imperial "Army Discipline and Regulation Act, 1879," has been prepared.

The Secretary of State has permitted the Regiment to be called the "Ceylon Light Infantry Volunteers."

The number of Volunteers enrolled up to the 31st August was 1,103; of whom 97 have been struck off, leaving 1,006 men, of the following nationalities:—

British ...	229	Tamils .	73
Eurasian ...	469	Sinhalese ...	93
Malays .	112	Others ...	30

Of these, 404 became efficient before 1st September.

FORMATION OF A VOLUNTEER REGIMENT.

SUMMARY OF STEPS TAKEN.

The following gentlemen have been gazetted Officers of the Regiment:—

Commanding Officer.

J. S. Armitage, Esq.

Majors.

W. J. Gorman, Esq.
R. A. Bosanquet, Esq.

Captain and Adjutant.

G. L. Gwatkin, Esq.

Captains.

Hon. L. B. Clarence.
C. C. Armitage, Esq.
W. F Courthope, Esq.
E. Elliott, Esq.
W. Cantrell, Esq.
J. C Collum, Esq. (Supernumerary)
A. Murray, Esq.
H. Byrde, Esq.
J. Paterson, Esq.
C. P. Layard, Esq.
G. Munro, Esq.

Lieutenants.

Hon. J. Van Langenberg.
E. C. Britton, Esq.
P. C. Oswald, Esq.
A. Thomson, Esq.
R. H. Morgan, Esq.
G H. Alston, Esq.
C. Good, Esq.
F. C. Turner, Esq.
F. Van Langenberg, Esq.
E. C. Davies, Esq.
W. J. S. Boake, Esq.
J. M. Greig, Esq.

Second Lieutenants.

D. Young, Esq.
R. Tatham, Esq.
F. Dornhorst, Esq.
R. A. Brohier, Esq.
A. O. Joseph, Esq.
E. Daniels, Esq.
G. S. Saxton, Esq.
C. J. H. F. Townsend, Esq.
F. M. Green, Esq.
E. Cave-Browne, Esq.
W. H. Dickman, Esq.

Surgeons.

Dr. T. H. F. Tothill.
Dr. J. L. Vanderstraaten
Dr. H. Thornhill.
Mr. T. F. Garvin

Honorary Chaplain

Rev. H. Newton.

Colombo, 1st September, 1881.

XVII.—1881.

COFFEE LEAF DISEASE.

THIRD REPORT

BY

H. MARSHALL WARD, Esq.

WITH

A COVERING LETTER FROM THE DIRECTOR OF THE ROYAL BOTANIC GARDENS.

(In continuation of Sessional Paper No. L. of 1880.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

COFFEE LEAF DISEASE.

LETTER FROM THE DIRECTOR OF THE ROYAL BOTANIC GARDENS, FORWARDING A THIRD REPORT BY MR. MARSHALL WARD, CRYPTOGAMIST.

No. 29.

Royal Botanic Gardens,
Pérádeniya, 19th September, 1881.

COFFEE LEAF DISEASE.

LETTER FROM DIRECTOR, ROYAL BOTANIC GARDENS.

SIR,—I HAVE the honour to forward to you a Third Report on Coffee Leaf Disease by Mr. Marshall Ward. In this he sums up the whole results of his investigation, which has extended over more than twenty months.

1. Continuing in the steady course of direct experiment and observation, and avoiding everything in the way of conjecture or theory, the Cryptogamist has now established the main facts of the true nature of this parasitic disease beyond dispute. Briefly, they are these. Leaf disease itself is purely local and in no sense constitutional; it is caused solely by the *Hemileia*, runs a short and definite course, and is so formidable from the cumulative effect of constant repetition. The whole *direct* damage done by the fungus to coffee is loss of leaves; other serious evils, however, and especially diminished crops, follow on from this. Cleared of many erroneous observations and inferences, the ordinary life-history of *Hemileia* is now shown to be of extreme simplicity, and the necessary conditions for, and exact duration of, each stage from spore to spore again have been demonstrated with unfailing and convincing frequency. It is not too much to say that as regards the structure, circumstances and habits of *Hemileia* on the coffee leaf, we are now completely informed; and probably no fungus-pest has ever before received so prolonged and continuous an examination.

2. This being so, I apprehend the stage to be now arrived at when remedial measures may be intelligently considered, and blind, empirical and hap-hazard experiments (so-called) to be no longer justifiable. We know that there is one sufficient cause of leaf disease —the uredospore of *Hemileia vastatrix*, that this is produced only by a previous one, is carried freely by the wind, may retain its vitality for several weeks or months, and can germinate only in moisture. This then is a *vera causa*, and, in accordance with the well-known medical aphorism, to remove this would be the true practice. Difficult and perhaps impossible as this may be under present circumstances, Mr. Ward here urges several preventive measures acting in this way, and it is, in my opinion, the one which promises the best results to the practical and inventive capacity of coffee planters. Valuable guides, also in the same direction, are found in the close relations here clearly formulated between attacks of disease and weather. The portion of the report devoted to this subject deserves careful study for its obvious practical bearings, especially as to the question of the possibility of having the coffee tree in the most suitable condition for resisting the effects of the growth of the parasite at the season of its chief invasions.

3. Next to removing the cause come curative measures. Mr. Ward has done well to insist strongly that to find an agent that will kill *Hemileia* is not the most important or indeed a difficult thing to do. But he has narrowed down the practically available chemical substances of this kind to a very few, and his experiments with them do not, in my opinion, lead one to expect that it is in this direction that the principal relief is likely to be found. We may surely now well reject all notions of "cures" and specifics. "Prevention is better than cure" is an old adage, and with our new vantage ground of knowledge of the extremely short period during which it is possible to get at the parasite at all, the short life of each individual *Hemileia* plant, and the frequency and want of periodicity (in the almanac sense) in the attacks of the disease, it may well be doubted whether so much benefit is to be obtained by never-ending attempts to check each attack, as by a general combination to destroy spores and hinder their dispersion. I would particularly call attention to the experiments with lime and sulphur made by Mr. Anton at Harrow—in their careful accuracy models worthy of imitation of the mode in which such should be conducted—as illustrative of the temporary nature of the benefit obtained at so large an expense.

4. The only other course is by careful cultivation, judicious manuring, and attention to the individual trees, so to improve the coffee as to enable it to endure the disease, produce

COFFEE LEAF DISEASE.

LETTER FROM DIRECTOR, ROYAL BOTANIC GARDENS.

fresh leaves, and bear a larger crop; but Mr. Ward properly points out that the benefit so obtained is not due to lessening in any degree leaf disease; the parasite indeed is likely to be increased rather than diminished.

5. On the whole, I am convinced that the possession of this clear and connected history of the disease of the coffee leaf in Ceylon is a great gain, and has given us a largely increased chance of dealing with its ravages.

6. As I have been requested by you to offer my opinion as to the desirability or otherwise of the Cryptogamist's appointment being continued over a third year, I have, in concert with Mr. Ward himself, considered carefully the present position of the enquiry from all points of view. I may say at once that Mr. Ward looks upon the present report as final in its character, and does not anticipate that any discovery of practical value would result from further work at *Hemileia*. Indeed the only point of any importance remaining unsolved is the history of the second kind of spore to which attention was called in the last report. To that account nothing can yet be added. From the purely scientific aspect of the enquiry, further information on this matter would doubtless be of considerable interest, but any practical bearing of the discovery of a second host-plant for the fungus is rendered unimportant, since the ordinary mode of its direct dissemination by the yellow uredospores has been so completely demonstrated. The Cryptogamist does not consider that another year's sojourn in Ceylon would be profitably spent either to the Colony or to himself in this search, which would be possibly futile (since the discovery of such a plant, if it exist here, is greatly a matter of chance), or, if successful, offers so slight a probability of contributing to the main purpose of the enquiry. In this opinion I fully concur. I may add, however, that though Mr. Ward may be no longer in Ceylon next year, we may perhaps have yet the benefit of some researches on the nutrition of plant-cells, commenced here in connection with coffee, but requiring for their completion work in the well-equipped laboratories of Europe and facility of reference to living authorities and published memoirs. This work, though not strictly any part of the Leaf Disease Enquiry, bids fair to be of special value to the growers of our staple product.

I am, &c.,

HENRY TRIMEN,
Director, Royal Botanic Gardens.

COFFEE LEAF DISEASE.

THIRD REPORT.

From H. MARSHALL WARD, Esq., to the Hon. the COLONIAL SECRETARY.

SIR,—I HAVE the honour to present you with a further report on the progress of the investigation into the life-history of *Hemileia vastatrix*, which I have conducted during my stay in Ceylon.

You will see that the nature of the fungus, and its causal relations with "leaf-disease" on the coffee in the Island are satisfactorily determined, and that the knowledge now to hand, together with what has been put forward in my previous reports, leaves no doubts as to the bearing of the several points established upon the general questions which have been raised.

So far as coffee is concerned, the life-history and anatomy of *Hemileia vastatrix* may be considered complete. The important periods occupied by the several phases of its life-history have also been ascertained, and a considerable number of developmental periods on the part of the coffee have been resolved and brought into correlation therewith.

I have, moreover, to call your attention to the real connection between climate and leaf-disease, which is no longer to be looked upon as a vague expression; but which I have shown to be of exactly the same nature as the relations existing between any other organism and its physical environment, and comparable to the equally important dependence of coffee or any other plant upon climatic conditions.

I have attempted to place the essential details of the history of this fungus, and its true relations to the coffee, &c., in the clearest form; and have omitted no fact which throws light on the difficulties experienced in understanding so intricate a subject. Having shown that the individual fungus plant is derived from without, and injures the coffee by robbing it of food—on the manufacture of which a large expenditure of energy had been employed—by occupying valuable space on the leaves, and by producing profound disturbances in the functions of the plant, I further proceed to the examination of the obvious consequences of such damage on a large scale—the falling of leaves, blossom, and crop.

The distribution of the fungus has also occupied much of my attention, and the fact that it is conveyed from place to place by wind is now established by irrefutable evidence. Other important means of distribution are fully examined below, and the facts collected remove all difficulties in understanding the wide and rapid spread of the parasite by the quickly germinating spores. I further proceed to show what occurs in large masses of coffee, as cultivated over vast open areas in Ceylon; and you will notice that the application of the preceding knowledge to the more complex problems there presented enables one to explain facts, or rather collections of facts, at first apparently difficult of explanation. One important point I would especially direct your attention towards:—what is known to the planters as an attack of leaf disease, followed by the fall of leaf, is not a simple matter, but the combined or successive effects of several generations of the fungus.

Much of my time has been devoted to experimental research into the efficacy of certain substances in destroying the fungus, and the advantages and disadvantages possessed by such of these as can be employed will be indicated below. It will be seen, however, that the problem of combating this disease is not a mere matter of quantity of chemicals and their efficacy in killing the fungus; in any scheme for mitigating the ravages of the pest, provision must be made for removing sources of re-infection, and at the same time keeping up the strength of the coffee tree. Moreover, whatever the application to the diseased leaves, it is clear that its continued action can only be counted upon for a short time after each renewal.

I have pointed out the importance of manuring and pruning, from the point of view suggested by the above, and it seems necessary to call particular attention to the value of whatever break-winds, or tracts of forest, or patana, &c., may separate estates from diseased areas. That the planting of other trees on estates, and among the coffee, is an important aid to the same effect will of course be apparent. "Leaf disease" appears to affect different estates in different degrees on account of variations in soil, climate and other physical peculiarities; but I would draw attention to the explanation of this. Careful cultivation and natural advantages of soil, climate, &c., enable certain estates to stand forth prominently, as though "leaf disease" did not affect them, or only to a slight extent: while poor nutrition, the ravages of insects, &c., have in other cases their effect as well as "leaf disease."

These attendant conditions, though they may complicate the problem before the individual planter, have of course, however, no connection with the origin of the parasite which causes "leaf disease." Manure, again, can in no way be looked upon as either a cause of the disease or a cure for it: its proper action is that of a food.

The question whence the fungus originated admits of no direct answer. I have however placed before you a strong array of facts tending to prove that *Hemileia* existed in Ceylon long before it was discovered on the cultivated coffee; if, indeed, *Hemileia vastatrix* proves identical with *Hemileia canthii*, there can be little room for doubt that the former passed to the coffee from the jungle, as I have long suspected to be the truth.

A review of events during the past year shows that the expectations held by planters during the earlier months of the season have not been fulfilled; and it must be recorded with regret that the general and magnificent blossoms which appeared so promising in March last have, with few exceptions, given result far below what was expected from them. Notwithstanding the favourable weather, and the rarity of the fungus at the time, a very small proportion of the flowers came to the stage of young fruit; and it is to be feared that a much smaller fraction will become ripe crop. As an illustration of this, I may quote the following from the remarks of a correspondent in one of the daily papers earlier in the year:—

"The prospects of a really good year could not have been more perfectly fulfilled from the succession of fine blossoms that came out; and, apparently, we had weather to set them beautifully. Hope against hope has been di-appointed: the greater number of these blossoms came to nothing; and then at most only gave the crop that is now showing, and that, I fear, will prove deceptive, although many estates have estimated from 25 per cent. to 50 per cent. over last year. The failure of the blossom is a mystery, for, on examining the clusters that have set, and are maturing on one side of an eye on a branch, on the other side of the same eye you find blossoms have entirely failed—in fact, when fresh blossoms came out of the same eye where the clusters were, they also failed, while latter blossoms on the same branch set all right. This cannot be laid down to leaf disease or want of manure."

It is important to notice, however, that some estates hold forth promise of even large crops, and that the general aspect is decidedly better than it was last year at a corresponding period.

That this improvement is largely due to the more favourable season of the current year, and the condition of the trees after the rest of last year, there can be no doubt; but to this must be added the equally true statement that careful cultivation and attention have had marked effects in enabling trees to set and ripen crop to a larger extent than they would otherwise have done, as is shown by comparing more neglected coffee.

SEC. I.—THE LIFE-HISTORY OF *HEMILEIA VASTATRIX* ON COFFEE.

§ 1. The outcome of numerous observations in addition to and in continuation of those referred to in former reports shows that the history of the fungus which causes coffee leaf disease may be fairly stated thus.

An orange-coloured papillate spore, or granule of "rust," taken from a patch on a diseased leaf and sown in a drop of water on the lower surface of a healthy coffee leaf, soon germinates—*i.e.*, it absorbs water and oxygen, swells up slightly and protrudes a delicate, thin-walled tube from one or more points of its surface. This tube is a *direct continuation of the spore itself*, and the granular orange-coloured contents of the latter pass along the cavity of the tube as it extends on the surface of the leaf.

On arriving at the orifice of a *stoma* or "breathing-pore," this germinal tube commences to block it up, and soon sends a prolongation through the orifice into the passages between the loosely arranged cells of the interior of the leaf. Once safe inside the leaf, the short tube begins to branch in two or three directions, each branch absorbing the fluid bathing the leaf cells with which it is in contact.

As these first-formed branches gather strength and material, they put forth several other branches which rapidly extend into the spaces between the tissues around, and in this manner is formed a spreading meshwork or *mycelium* of short, stumpy, fungal tubes. As growth proceeds from the primary tubes in all directions around the point of entry, the increasing *mycelium* soon requires more food than can be obtained by simply absorbing the nutritive fluids bathing the leaf-cells with which the branches are closely in contact; this increased demand for food is effectually supplied after a time by the sucking organs, or *haustoria*, which become formed by the older branches. Each bores through the wall of the cell with which it is in contact, and by means of the perforated passage obtains as food the contents of the leaf-cell.

As growth proceeds in all directions from the point of entrance of the germinal tube—*i.e.*, a *stoma*—the leaf-cells first attacked and injured are evidently those nearest this central point, and the destruction of tissue proceeds in a centrifugal manner, *pari passu*, with the spread of the destroying *mycelium*.

The injured cells become paler in colour as their contents become altered and destroyed, and thus shine through the outer layers of the leaf with a paler hue than the remainder of the tissue: the yellowish circular spot thus produced is the first indication to the naked eye of the damage done to the leaf—it is the so-called "pin-spot." As the destroying

mycelium extends itself further into the tissues, its course is marked by dying cells, and a circular spreading of the pale disease patch is obvious to the outward observer. From the same cause the discolouration appears at a later date on the upper surface of the leaf, as the branches extend there.

When a vigorous, centrifugally spreading mycelium has thus been formed, the older portions at the centre commence to form *spores:* these are produced in compact groups from the substance of certain processes which are formed by aggregations of branches of the mycelium forced through the stomata. The first formed spore-groups appear at those stomata which lie close around the point of origin of the mycelium, and they are followed by others successively protruding through stomata further and further away from this point: thus, the production of spore-bearing heads also takes place in a centrifugal manner, and successive circles of them become arranged around those first formed. Each spore-bearing head is capable of producing large numbers of spores, successively budding forth during the period of activity.

After a stock of spores has commenced to accumulate, falling off as they become ripe, and adhering to the leaf as the yellow or orange-coloured "rust powder," the completely exhausted leaf-cells, which have been destroyed by the mycelium, turn brown and decay, and in place of active, translucent, living cells, we find a mass of empty, shrivelled, useless, and discoloured vesicles. From what has been said above, it is evident that the resulting brown dead patch, seen from without, necessarily commences in the centre and spreads in a circular manner as before. Under certain circumstances, the second form of spore is produced later by the old spore-bearing heads, and shortly afterwards the growth ceases. In most cases, however, the attacked leaf falls before this, especially when many "disease spots" have become established in its tissues.

The above is a short account of the succession of phenomena presented by the fungus on the coffee, from the germination of the papillate spore to the production of many similar spores from the adult mycelium; and it must be noted that each one of these spores is capable of reproducing the same cycle of phenomena, provided it meets with proper conditions of development. In this way the germination, growth, and reproduction of *Hemileia* are repeated again and again on the coffee on estates.

I will now proceed to state the results of observations and experiments made to determine the following points:—

(*a*) What period is required; and
(*b*) What conditions are necessary, for the complete germination of the spore?
(*c*) What length of time is occupied in forming a vigorous mycelium?
(*d*) How soon after the germination of the spore may the mycelium produce spores again? and
(*e*) How long may the "disease spot" luxuriate at the expense of the leaf?

§ 2. (*a*) How long a period is required, and (*b*) what conditions are necessary for the germination of the papillate spore?

I find that a spore of *Hemileia* is capable of germination immediately after its complete formation on the disease spot, and that in 12 to 24 hours after its removal from the "rust" patch to a healthy leaf, it may throw out its germinal tube: the conditions necessary for this are the presence of water, oxygen, and a sufficiently high temperature. If the mature spores be gathered dry and kept dry and cool for some time, no change occurs during that time; nevertheless, spores thus kept for six weeks in a closely-stopped dry tube, germinated. In close covered cells, again, where the parts were sealed with wax, I have sometimes found germination delayed, or even altogether prevented. Finally, in cases where coffee on flats has become chilled or "frosted" by excessive radiation, the spores of *Hemileia* may be found destroyed in large numbers.

The sum total of observations indicates that germination occurs most rapidly in a warm, damp, steamy atmosphere on the surface of vigorous young leaves. Under these favourable circumstances, germination is commonly completed and the tubes have begun to enter the stomata within 48 hours from the moment of sowing.

Germination—*i.e.*, the swelling of the spore, and protrusion of one or more germinal tubes—may apparently take place anywhere and on any surface, provided the necessary conditions of moisture, &c., are fulfilled; and it is a fact that myriads of the spores germinate on substances other than a coffee leaf, only to shrivel up and die at the completion of the process.* Experiments already quoted in previous reports show that this is true for glass slips, and I have demonstrated the same for cloth, soil, and rocks on estates, &c.

Where germination occurs on a living coffee-leaf, however, the tube does not thus die, but enters a stoma, and forms the mycelium as described above; and this suggests the next question.

§ 3. (*c*) What length of time is necessary for the formation of a vigorous mycelium?

On the third or fourth day after a successful sowing of the spores, I almost invariably find a small branched mycelium within the leaf; vertical sections of the infected part of

* There is, however, an exception to this statement, as I shall describe shortly, in the leaf of one other plant, *Canthium campanulatum.*

COFFEE LEAF DISEASE.

THIRD REPORT.

the leaf show that the tube has penetrated through the stoma, and begun to branch in the intercellular spaces connected with it, while horizontal sections of that portion of the leaf show that the branches (usually about three) at first spread in a direction parallel to the plane of the leaf. At first there are no haustoria, and the contents of the tubular, stumpy branches are pale and finely granular at the growing ends.

Within a week from the date of entrance through the stoma, the mycelium has become a tolerably vigorous structure, rapidly spreading in a centrifugal manner as described, but still living on the fluids bathing the cells, the contents of which are still, to all appearance, healthy. During the second week, the minute parasite increases rapidly in size and vigour, and the leaf cells first attacked have by this time haustoria piercing their walls in all directions, and, as a rule, sucking out their contents. It is usually about the end of the second week, therefore, before the pale discolouration (caused by the shining through of the damaged cells) first becomes observable.

It will be seen further on how remarkably constant are the phenomena described; nevertheless, it is not to be wondered at that some differences occur. It is of importance to note that no other conditions than those given appear to be necessary for the development of the mycelium. A succulent young leaf, with thin cell walls, sometimes developes a spot more rapidly, probably because the cells are more easily emptied by the mycelium than are those of an adult, leathery leaf, under the same circumstances; but no evidence of a "necessary predisposition to disease" on the part of the coffee plant is forthcoming, and it cannot now be doubted that any leaf of any variety of coffee will allow of the entry of the tubes, and their development into mycelia. So far as any general statement can be made on the subject, a vigorous and perfectly healthy leaf of West Indian coffee is quite as easily infected with the disease as an Eastern variety, or, if anything, more rapidly.

No doubt the quantity and quality of food present in the leaf cells, the vigour of the sap-flow, the thickness of the cell walls to be broken into, and the number, &c., of cells to be attacked, have their due effect on the rapidity of development of the fungus; and we already know that the degree of moisture, warmth, &c., as well as characters of soil, affect the coffee tree—and through it, of course, the parasitic fungus, as is evident from the co-relations of both. It may be fairly stated, however, that under ordinary circumstances the pale, yellowish "pin-spot," heralding the outbreak of "rust." is observed about fourteen or fifteen days after germination of the spore, and this is sufficiently constant (of course I speak from experience at Pérádeniya) to enable one to predict the date of appearance of the disease spot, after making a sowing of the spores, with considerable certainty.

To give an instance. On July 24th of this year a few yellow spores were sown on the under-side of a vigorous young leaf of a variety of *Coffee arabica*, and the sowing enclosed in a cell clipped on to the living leaf and kept moist as in previous experiments. From other experiments with the same variety of coffee during June and July, I was led to expect that the first indication of the yellow patch to the naked eye should appear in 15 days from the sowing of the spores, and accordingly made a note to the effect that the "pin-spot" should be visible on August 8th following. The plant was put into a closed Wardian case, and remained quiet as in other experiments.

On August 7th, the first indication of a barely visible yellowish discolouration was detected; this increased during the 8th, and on the morning of the 9th was quite distinct as a "pin-spot" visible to the unaided eye. This remarkable experiment is illustrative of a series extending over many months and more or less successful in an equal degree; and I would call your attention to the following facts regarding them, as placing still further beyond cavil the nature of the parasite.

The fungus mycelium arises *in the tissues immediately covered by the area whereon the sowing is made*, and no matter how "virulent" the produced spot may be, *the early discolouration affects no other region of the leaf or plant.* I have now (September) five plants in a case, each of which was infected in January last. In each example the "disease spot" appeared at the region of infection *and nowhere else.* Up to date *no other spot has appeared, either on the infected leaf or elsewhere on the plant.* Here, again, I am quoting a few examples out of a much larger number illustrating the same thing. We may now pass on to the next question.

§ 4. (*d*) How soon after the germination of the spores may the mycelium produce spores again?

Here, again, my statements depend upon experiments of the same nature as those above quoted, and the outcome of these indicates that a few spores generally appear in the centre of the yellow patch a day or two after it is visible to the unaided eye—*i. e.*, during the third week of its life the mycelium commences to bear the spores in the manner described above. There appears to be more variation in the time required for the production of spores, however, than in that required for the formation of the mycelium. In very hot weather after rain the rapidity of their formation is marvellous, and the yellow patch is quickly covered with the orange-coloured dust. They, moreover, are produced more rapidly and in greater quantity on a vigorously active young leaf than on an old matured one under the same conditions. That the nutrition of the leaf-cells, by affecting that of the mycelium, influences the amount and rate of development of spores, there can be no doubt;

(See Appendix.)

and cases are not uncommon where the mycelium produces no spores at all, or very few, and these very slowly. On the other hand, in very succulent, quickly-grown leaves with thin-walled tissues, and full of fluid, I have known the spores to appear in 10 days from the sowing of the original spores, and I am informed by Captain Bailey of Galle that he has found a sucker which was not 14 days old, with the spores fully developed upon the leaf. This would also appear to be a case in point. Nevertheless, in the majority of experiments the spores appear during the third week—a result which, as already stated, admits of prediction being founded upon it with considerable accuracy.

As to the number of spores produced, and the time during which the mycelium produces them, no general statement can be made. As already said, no spores at all appear in some cases, while on well-nourished mycelia their numbers are enormous. In some of my experiments, where only one patch of mycelium is fed by the plant, I have noticed long, pendent clusters of spores hanging down from each stoma into the perfectly quiet atmosphere of the wardian case. Supposing each of these clusters to be 1-25th of an inch long, and that 100 of the clusters depend from the whole patch, it may be deduced, from certain known particulars as to the size, &c., of the individual spore, that in the example given *there were probably a hundred and fifty thousand spores visible at the same time.* This was on one rust patch, and I have counted as many as 127 disease spots on a single pair of leaves.

Of course, such pendent clusters never form in the open, since the slightest movement of the leaf by currents of air would scatter the loosely-attached spores in all directions; nevertheless, equal numbers must be formed on estates, only the wind detaches them as fast as they are matured. A simple proof of the successive appearance of the spores is afforded by the following experiment. On lightly rubbing the end of the finger or a brush over a rush patch, vigorously active in fine weather, all the spores may be removed from the spore heads except very rudimentary ones: on re-examining the smooth patch some 24 to 48 hours after, the powdery spores have again covered the patch. This may even occur on the ground, so long as the leaf still retains its green colour—a fact of no small importance in considering the possibility of removing fallen leaves.

§ 5 (*e*).—As to the time during which the above spore-production goes on, I have established the following facts. In experiments where only one disease spot is allowed to flourish on a single leaf of the plant, the spores may be formed continuously during eight to ten weeks or longer, if the plant is in a vigorous state and kept undisturbed: even in the open, I have watched disease-spots on which spores continuously appeared for five or six weeks in fine growing weather.

But, as a rule, the leaf falls before the mycelium has attained the possible limits of its development, either from being torn off by wind, or because numerous "disease spots" have formed, and the leaf soon succumbs to the multitudinous drains on its resources. It is certainly a remarkable fact that a leaf will support one or two "disease spots" for a long time without apparent injury; but this is easily explained if one bears in mind that the limits of the mycelium closely correspond with those of the discoloured patch. Excepting that a tax is put upon the cells in more distant parts of the leaf—since the local action of the mycelium is very powerful—it must be remembered that all the green parts of the leaf are still practically healthy, and can do work for the plant. In proof of this I may cite an experiment made on a healthy plant of Jamaica coffee. The leaves were all removed but two, besides the terminal bud; a sowing was made on one of the two dark green, full-sized, and very fine leaves. On January the 28th the first spores arose from the yellow "disease spot," increased in numbers, and were produced in abundance during the following two months. The activity of spore production then slowly diminished as the destroyed tissues turned black, but up to May 25th (*i. e.*, nearly four months later) there was still a feeble production of spores around the edges of the slowly spreading spot; the rest of the leaf remained dark green, and, to all appearance, perfectly healthy; and so it has remained up to this date (October 5th)—half the leaf black and shrivelled from the action of the fungus, the other half healthy and green. Not only are both leaves still firmly attached, but several new ones have been formed by the plant. In cases where several "disease spots" are permitted to drain the leaf, however, the latter soon falls, and this is of course what occurs on estates generally.

(See Appendix.)

The Life-history of a pair of Coffee leaves, before and after being attacked by Hemileia.

I will now trace the history of a pair of leaves, as actually observed on coffee in the open, as a simple example of what occurs where the conditions cannot be controlled as in the above experiments.

§ 6. The bud, a terminal one, became exposed about the 1st of March, 1881, as the then end pair of young leaves diverged from one another; it remained as a minute green point, shining and hard from the resinous coating excreted over it, up to March 14th. Soon after, about March 21st, a gradual swelling of the bud was observed, and by March 29th the two new leaves were seen as dark green, somewhat ovate bodies tightly appressed face to face, and about a quarter of an inch long.

If we now examine the kind of weather which, generally speaking, prevailed during this period, a natural correspondence is traced between it and the development of the bud.

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During the first three weeks of March, a continuance of dry, hot days caused all quick growth to cease, but the opening of the bud commenced at once after the showers which set in towards the end of March, and continued for the most part throughout April.

On April the 2nd, in fact, after a week of showery growing weather, the swollen bud had burst, and presented two leaves each ¾ inch long, and by April 25th these were fully formed, handsome, bright green structures, about 4½ inches long by 2½ inches broad in the middle:—on or about this date the leaves ceased to enlarge, and may be considered adult, and in full working order.

During the last week in April and the first week in May, much rain fell in heavy showers; but from May 8 to May 25th a hot period intervened, the mornings being frequently close and steamy, however. At this time a few spots of "leaf disease" were observable here and there on surrounding coffee trees.

Now, from April 25th, the period at which we may consider the leaves adult, to June 1st, no trace of *Hemileia* was discovered on either of the leaves; but on June 1st a distinct, though small "pin-spot" was seen on one of the leaves, which I shall call the left-hand leaf, and on June 3rd a few spores were seen proceeding from this. On the latter date, also, I found a minute yellow "pin-spot" on the right-hand leaf of the pair.

The question is, what connection had the weather, the presence of spores, and other circumstances with this definite appearance of two "leaf disease spots" on leaves which had been to all appearance perfectly healthy from April 25th to June 1st—*i.e.*, during some five weeks? It may first be stated that the weather from May 25th commenced to indicate the wet usually associated with the incoming of the south-west monsoon, and wind and rain prevailed more or less up to the end of June, June 20th to 26th being, however, fine.

The disease was first noticed on June 1st: if the "pin-spot" arose from the germination of a spore as described above (§ 2), this spore probably commenced its action within three weeks or so previously. On comparing the notes made about the requisite period, two points are clear: 1st, there were spores being shaken and blown about at that time; 2nd, it rained heavily up to May 8th, and a series of hot, close, steamy mornings occurred thereabouts, and it also rained during the week preceding the discovery of the spot. It is evident, in fact, that an odd spore of *Hemileia* germinated (probably in the dew) on each leaf on or about the 16th—18th of May, and sent its tube into the leaf to form the mycelium of which the presence was discovered on June 1st—3rd.

On June 15th, the spot on the left-hand leaf was large, and producing abundance of orange spores which were being widely distributed by the high winds (from June 3rd to 15th), as well on surrounding trees and leaves as on other portions of the same leaf surface.

On June 29th, many more disease spots were apparent for the first time: these rapidly came to produce spores, and on July 1st numbered 35 new patches, each pouring forth hundreds of spores to be distributed as usual. The spores which produced these probably germinated about June 15th in the showers so prevalent during the month. By this time, also, the disease was bad all over the tree. I think it highly probable that the 35 new spots arose from spores detached from the one spot of June 3rd.

By July 6th, the leaf was badly diseased: the one older spot (of July 3rd) beginning to turn brown in centre, but still active in spores; the others, which might be termed the second generation, shining through above with an orange hue.

On July 15th, there appeared about 12 new spots, evidently from spores which germinated during the wet week preceding July 1st. Each series of spots on the left-hand leaf could now be distinguished as follows:—One large and old spot, with a black patch in the centre, and few spores—that of June 3rd. A number (35) of very active spots which are just commencing to become brown in the centre—those of June 29th. A smaller number (12) of new active spots and only just tinged yellow above—those of July 15th.

On July 23rd, the leaf was evidently becoming destroyed by the numerous (48) virulent spots draining it, and curious green rings around the spots of June 29th alone represented the normal colour of the leaf; by July 26th, these had faded, and the leaf was quite yellow and exhausted, and it fell during the night of that date.

As to the right-hand leaf, its history is very similar. On June 15th there were two *Hemileia* spots on it, a new one having appeared in addition to that of June 3rd; on the 29th June appeared 57 new ones, which spread rapidly, and covered the greater part of the leaf by the 6th July; on July 15th were 13 still newer spots: the three generations were quite evident on July 27th, when the leaf was yellow. Before the last day of July this leaf also had fallen.

It is clear from the foregoing that what the planters term an "attack" of leaf disease—*i.e.*, a sudden outburst of the "rust"—results from the coming to maturity at or about the same time of a series of mycelia which have been formed from the successful sowing of a certain number of spores, and since all were exposed to similar conditions we must look for the origin of the rust to the conditions previously present. It is clear, however, that we cannot say exactly when a given disease spot commenced to form; we can only argue from the known data. I do not think that any mycelium takes less than one week, or more than three weeks to form, as a rule, however, and hence the above argument may be widely applied.

But the serious matter to face is the evident cumulative power of the fungus; in the examples cited, the few isolated spots produced (no doubt by the germination of spores from fallen leaves, &c.) during May, in their turn sowed spores which came to a head in June: these became sown and were successful before July, and so on. The effect on the tree cannot be wondered at, where the above recorded history of a pair of leaves may be approximately put as follows:—

One month to form the pair (March 25th—April 25th); one and a quarter month in the enjoyment of normal functions, &c., April 25th—June 3rd); three-quarters of a month with one or two disease spots (June 3rd—29th); one month of continual struggle with increasing spots (June 29th—July 27th); finally resulting in the destruction of the leaves.

On the connection between Climate and "Leaf Disease," &c.

§ 7. An early observation in the present investigation was that the more carefully coffee plants were sheltered, the less "leaf disease" did they appear to incur. As I progressed, the following truths became apparent also. In the S.W. monsoon, coffee plants placed in a verandah in the teeth of the wind suffer more from the disease than similar plants in the N.E. verandah, and therefore sheltered, while the reverse holds good, generally speaking, for the alternate monsoon. In the gardens at Pérádeniya, moreover, the disease hardly affects plants which are sheltered, at a time when the S.W. monsoon is blowing through exposed trees with hardly a leaf left on them. One patch of trees is very instructive in this respect. There is one tree at the end through which the S.W. wind blows before reaching the others; and it is dark green and bushy, long after the other trees are badly diseased and nearly leafless. The explanation seems simple: all the spores formed on this tree are blown away to the other trees—any spores to reach this tree must first travel about a quarter of a mile, a public road, bamboos, and the river intervening. When the wind changes, however, this tree becomes very bad, being in its turn the possible recipient of every spore formed on the trees now to windward. With this change of wind, also, the trees at the other end of the patch recover more rapidly than those more to leeward.

An extension of these observations to estates and larger masses of coffee demonstrates the fact that the sudden appearance of the "disease" is closely connected with *wind*, and this connection is of exactly the same nature as we should expect if the wind blows spores about. That the wind does carry spores of *Hemileia* as well as other fungi, is now proved. How far a single spore may be borne on a high wind is partly answered by my experiments in July, &c. Here were clearly spores caught in transit under such circumstances that we may safely conclude they would have travelled at least twice as far if they had not been caught by the obstruction—that is to say, the spores would travel 50 feet in one journey. But it must be remembered that the very light dry spore torn by the wind from a leaf on a hill or other elevation might be carried much further. (See Appendix.)

But even if the spore only moves *per saltum*, it may be borne some distance on a dry, gusty day over such open country as the coffee districts, and there can be no doubt that, once it has reached an area of coffee, the fungus has every chance of distributing its spores rapidly over the trees to leeward; the progeny having equally good chances, on the whole, of travelling back again when the wind blows in the opposite direction. It is in accordance with these facts that wind-blown areas of coffee become so badly diseased.

But another series of events suggested an equally important connection with atmospheric *moisture*. Of two series of plants in the same exposed verandah, I found that those placed on the edges of the verandah, and kept wetter on the whole (from drip, driving rain, &c.), appeared to become worse "diseased" than more sheltered ones. Experiments then proved that plants strewn with spores and placed in wardian cases became diseased in a fortnight to three weeks, if the interior of the cases was kept wet and the atmosphere surcharged with moisture; whereas in very dry cases no such infection took place. These and other experiments now before you led to the establishment of the connection between rain, dew, &c., and the outbreak of disease, and is in agreement with the known facts that *Hemileia* flourishes especially in damp, steamy districts, and breaks out suddenly and badly in close, hot weather after rain.

The suggestions that electrical disturbances, &c., have any influence in producing or diminishing attacks of "leaf disease" have not been corroborated by investigation. I find nothing to warrant any direct connection between the phenomena of disease and thunderstorms.

But the admitted fact, that the great outbursts of *Hemileia* occur during the S.W. monsoon, and about the break of the N.E. monsoon, is also in accordance with the foregoing. It is in June and July especially that the winds and saturating rains first occur near Kandy, for instance, and it is in July and August that the "disease" is at its height: clearly this occurs because the wind distributes spores which the rain then causes to germinate. So, also, during the other periods of wind and rain. It is difficult to say of any two seasons that the outbreaks of *Hemileia* are more or less virulent, because no standard of comparison is given. In continuously wet weather the spores are less readily distributed by wind currents through the air, but each one stands a better chance of germinating on a neighbouring leaf: this I believe to be the reason why the "disease" comes and goes in virulent and sudden attacks in a dry year such as this; but "hangs about," to use a popular expression, during a wet season like that of 1880. The same of course applies

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to damp and sheltered portions of an estate, or whole estates, or even districts, and a little reflection will convince any one with the competent knowledge that such is the case.

But there are other conditions to be taken into account in comparing the "attacks of leaf disease" in different districts, or on two estates, or even in different years. It is plain that, since *Hemileia* only attacks the leaves, there can be none of these extensive outbursts of disease on denuded coffee, and hence, from circumstances of soil, treatment, climate, &c., it may occur that two areas of coffee differing in this respect—*i. e.*, in the proportion of foliage on the trees—may differ in the amount of "rust" and in the apparent "virulence of the disease." It is because a large surface of food material is offered to the fungus that it is so successful, and it is because a large area of leaf surface is offered to the spores, that they effect their inroads on the coffee with such facility.

Speaking of the coffee near Pérádeniya for illustration, then, (each valley, and many estates differing in various ways as regards climate) the chief reasons that there was so little "leaf-disease" noticeable during February, March, and April of this year (1881) may be thus summed up:—(1) There were at that time but few leaves formed on the trees, and therefore but little surface on which the wind could sow spores; (2) there was but little wind to carry spores, and hence few flying spores to be sown; and (3) the rain was chiefly in showers with long dry intervals, and so the under surface of the leaf would rarely be wet for more than a few hours at a time.

But with the April rains came the conditions required for the germination of the comparatively few spores which had been successfully placed in the interval, and these gave rise to the still (comparatively) few "rust-patches" of May—June. Then came the heavy winds, and scattered the "rust" produced by these patches on to the now numerous leaves; rains, moist air, and dews accompanying or following the wind; the consequence and climax being a widespread attack in July. On July 15th the weather cleared up, and it was hot until the end of the month, and, although a number of spores would germinate in the dews here and there, there was a lull in the disease as the already-destroyed leaves fell to the ground. Much distribution of spores occurred in this dry interval however, and the rains in August enabled them to form mycelia, and so on.

It is therefore evident that no general statement can be made as to the time of year an "attack of leaf-disease" may be expected, beyond saying that, since it is at the burst of the south-west monsoon (or north-east as the case may be) that the estate is in full leaf, the winds carrying spores about and shaking the trees, and the rains are affording moisture for the germination of the spores, so it is some time within three weeks to a month afterwards that the outbreak of rust may be expected.

That pruning, manuring, shelter, and other such processes of cultivation should be directed in accordance with these principles, will be obvious, but as this is important I shall refer to it in more detail shortly.

"Attacks of Leaf Disease."

§ 8. Since illustrations from the estates themselves are in some respects more intelligible, I propose to give one or two examples further showing the truth of the above remarks.

On an estate in Dimbula the experiences as regards the outbreaks of leaf disease this year were as follows. The disease commenced to show in May, increasing during June, and becoming very severe about July 1st, when the attack was at its height; before or about the 15th of July an immense quantity of leaves were falling, and the disease was "passing away." Very little more occurred, except in damp corners of the estate, until August, when a milder attack was noticed towards the end. One examining the weather and state of the coffee from February, it is clear that this illustration confirms what has been already said.

During the April rains the spores (which had been slowly accumulating as the leaves formed) germinated, and produced a larger stock of spores in time for the monsoon winds and rains of May and June. The latter month being very wet, we cannot doubt that immense numbers of spores germinated, their tubes entered the leaves, and the resulting mycelia would be rampant in July, as was the case. During July less germination went on in the dry weather, but a stock of spores was ready for the wet August, and the resulting mycelia should (according to experience) produce their spores about the end of the month. Such was the case, but the "attack was a milder one," partly because there were at that time fewer leaves left on the trees, partly because the winds had been less active in the interval.

A second illustration is afforded by an estate in the neighbourhood of Badulla. On the 1st January, 1881, the coffee was luxuriant in wood and leaf, but during the last week in January "a most virulent attack of leaf disease" appeared, and a bad fall of leaf succeeded it. By the end of February it had "passed away," and the coffee set to work to produce new leaves. By March 30th the "estate had recovered." The improvement went on through April and May up to June. A little *Hemileia* then showed itself, and during July and August a "mild attack" made itself evident.

The last 10 days in December, 1880, were "especially wet," with mists and rain all day. January opened with fine weather for most of the first fortnight, and then the wet weather returned for 16 days. February and March were fine, hot, and marked by thundershowers every now and again. The "virulent attack" which came on during the last

week in January would naturally result from the success of spores germinated during December, and the fact of its "passing away" in February is in agreement with what I have established earlier—that the spores accumulated could not germinate in the dry weather.

Another example may be taken from the extreme east of Uva, where the worst "attack of disease" came on in October and November.

In August, 1880, the place was looking fresh and green, and a little rain fell. September was very dry, and a "very mild attack of leaf disease" was experienced. October and November were wet, with a fine interval of about a week late in October. During November "a very bad attack of leaf disease was experienced, and a larger fall of leaf than had been witnessed for years." At this period, too, much crop fell from the trees. This state of affairs continued into December, which was a very wet month. During January, 1881, (the weather still wet) the dropping of crop continued from the trees still poor in foliage, but a diminution of disease was noticed. In February the weather became very dry, the remaining bad leaves dropped, and new ones commenced to form. This continued through the dry March, the new leaves being produced in weather when those spores which did get on to them could not germinate. In April the coffee had recovered and was quite green and luxuriant. But the large masses of foliage had now been exposed to occasional access of spores for three months or so, and the first spell of wet weather would be expected to cause their germination. This happened in May, the first 15 days of which were wet, and the consequence was an outbreak of the rust in June. These illustrations, read in the light of experiments and previous knowledge, show clearly enough the nature of the disease and the manner of its dependence on climate, &c.

We are now in a position to inquire further into the matter of leaf disease, as it occurs on large areas of coffee such as are found on estates and in open districts.

SEC. II.—LEAF DISEASE ON LARGE MASSES OF COFFEE.

§ 9. Perhaps the simplest example of what occurs on estates generally is afforded by what happened this year to a somewhat oblong patch of coffee trees, standing in a slightly isolated position at Pérádeniya, and on which I have kept close watch for the past 14 months. The wind of the S.W. monsoon blows through these trees along the longer axis of the group, and in such a way that one tree at the end receives the wind before the others.

During January last, many of the leaves had fallen, and the trees looked thin after the "attack of leaf disease" which occurred towards the end of the year 1880; on February 1st, 1881, there was in fact but one pair of leaves at the end of each twig in many cases, and no twig had more than two pairs and a terminal bud During the hot February, this end bud slowly developed, and before the end of March a second end bud had formed and opened; the average number of completed leaves at this time was, therefore, three pairs to each twig.

During the hot weather which prevailed in March, these leaves were all dark green, and healthy, and scarcely a trace of *Hemileia* was to be found in the gardens; the consequence was that each tree appeared fairly clothed with leaves, and though still somewhat thin, a dark green colour had come over the mass of coffee.

During April and May the formation of buds and leaves increased more rapidly in the growing weather; for although still very hot, a series of showery and steamy periods alternated, and the trees formed foliage with corresponding activity. Up to this period—the end of May - no leaf could be said to be "diseased" to any extent, and, indeed, it was not common to meet with a disease-spot at all.

It may be fairly stated, therefore, that during the period between January 1st and May 31st, the trees, after a short period of rest or exhaustion resulting from the late "attack of leaf disease," set to work vigorously to produce leaves, and that during the interval, at first slowly and then more rapidly, they succeeded so far as to produce five or six pairs of clean, healthy leaves along each free twig. From January 1st to May 1st, these trees would certainly have been pronounced "free from disease" in any estate report.

But unfortunately, the very weather which promoted the growth of leaves during April—*i.e.*, alternations of showery and hot periods, dewy mornings, &c.—also enabled a few straggling spores* of *Hemileia* to germinate here and there on the leaves. Consequently, before the end of May a corresponding number of "disease-spots" had burst forth from the infected leaves, and the spores produced by these were being shaken off, and more or less shed on surrounding leaves. During the first week in June a good many more spots, still isolated, had made their appearance, and what would probably be termed a "mild attack of leaf disease" was noticeable.

Before following the course of events further, I would, at the risk of repetition, call attention to the conditions which are found to rule the propagation of the fungus, and compare the facts with what occurred here. During the hot dry weather of February and March, apart from the fact that very few leaves existed for the fungus to attack, the want of moisture was of course inimical to the development of any spores accidentally conveyed

* These spores may have been blown on to the leaves from the leaves on the ground, or they may have persisted through the hot dry weather.

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to the living leaves from the leaves lying on the ground, and the few odd spores left from the last attack on the end leaves no doubt remained dormant. In April, however, a single showery night and dewy morning, probably followed by a steamy close day, might be sufficient to enable the spores near the stomata to send their tubes into the leaf; once inside, as we know, they are safe, and from what is taught by experiments, we should expect to see the "disease spots" fully developed within about three weeks. That this actually occurred is evident from the gradual increase of spots during May; each spot produced would then shed its spores around as the breeze shook the trees, and each spore washed to the underside of the leaf is capable of at once germinating, &c., as before. In this manner it is easy to explain the gradual accumulation of disease-spots and spores during May and the first week in June. That such is the explanation seems placed beyond doubt by the following facts:—

(1) During the first fortnight in May, observation showed that the shaking of the branches had caused many spores to fall on the leaves, &c., round about; that some of these remained adherent cannot be doubted.

(2) During the April and May showers it was easy to see that rain falling on the upper side of a leaf runs down to the point of the leaf, or along natural furrows to the edges, and that the drops of water there formed often contain spores of *Hemileia*. It is evidently in this manner that rains wash the spores to the edges and lower surface of the leaf; once there, germination is successful if the atmosphere remains moist for a sufficiently long time.

(3) Examination of the leaves in May showed that spores *were* present on the lower surfaces. Since the winds were not high, these probably reached their destination in the manner described.

(4) I have shown that moisture, a proper temperature, and oxygen are alone necessary for germination, and that if this occurs on the lower surface of the leaf the tubes enter and form mycelia in the intercellular spaces inside the leaf. An examination of the weather shows that just such conditions existed about the given periods as were required.

As I have shown, spores were present in some quantity on the leaves before the end of May, and before the 15th of June the trees were becoming badly diseased. The last week in May was a wet one (after a fortnight or more of *dry windy* weather), and the atmosphere damp for some days; then again followed a short period of warm, steamy, cloudy weather with brighter intervals. That numerous spores were distributed in May, and germinated in the interval between May 25th and June 1st, there can be no doubt, and I have shown that if such was the case, the resulting disease patches should begin to appear some 15 days or so later. And this actually occurred; for on June 15th my notes run:—"All trees except the one at south-west end badly diseased with "pin-spots," especially the lower branches. These lower branches are sheltered and moist."

It will thus be seen that the very close connection which exists between the parasite and its conditions of existence, &c., can be traced here, and it will also be seen that this connection is no more mysterious than that between the life of any organism and its natural environment: sow the spores of *Hemileia* on a proper nidus, and give them air, water and warmth, and they germinate and flourish as do the seeds of coffee or any similar plant in damp, warm, aërated soil.

The stock of spores formed on the trees was already large, but after June 15th—20th, an enormous increase occurred, and it is necessary to see the effect produced shortly afterwards. The weather on and about the 20th was hot and close, and every "disease patch" was manufacturing thousands of spores, the mycelia being abundantly fed by the now well filled leaves; windy periods had also occurred, and, partly by shaking the "rust" on to the same or lower leaves, partly by rubbing leaves together, and partly by carrying the spores bodily through the air, the wind had caused a very effectual dissemination of these spores. June 26th to 29th were wet days, and those successfully-located spores which had not germinated already, no doubt did so now; at intervals, up to July 5th, we had also wet weather All along were short periods of driving high winds alternating with steady south-west breezes.

It is clear that the stock of spores accumulated from the disease spots which commenced action on or about June 15th, had everything in their favour during the following three weeks, and it follows that during some three weeks later a corresponding amount of mycelium should be formed, and "leaf disease" be proportionally bad. The weather cleared up after July 5th and remained fine and hot for a fortnight or so, and during that period a most disastrous outbreak of the orange-coloured rust occurred, especially during the second week in July. These facts are again closely in accordance with what should be expected from the experiments; the disease spots which came out on July 14th, for instance, would be from spores which germinated about June 30th, or a day or two before, those which appeared on July 7th from germinal tubes of June 21st or later, and so on.

But still stronger evidence of these truths is afforded by what followed. On or about July 12th the air had become quite dry again, and up to July 30th no rain fell; from the 15th to the 30th, in fact, the air was so dry, and the winds (at intervals) so fresh, that probably no germination of spores could occur. Here, then, was a chance to test the accuracy of the preceding work, and I may mention that it was just such a dry interval that had before given me the clue to the facts.

During these 15 days or so, myriads of spores were formed and distributed by the wind. The rains came on again on August 1st, but the air did not become very moist, and fine weather with dry winds intervened during the first week. The number of spores which would germinate successfully during this week would probably be few, because the air was probably at no time nearly saturated for 24 consecutive hours, and the leaves were never wet for anything like so long a period; those spores which did germinate, however, should produce visible disease-spots on or about August 15th to 20th. I happen to have a curious and conclusive proof that such was the case.

A perfectly clean and healthy plant of *Coffea Arabica*, which had been sent to me in a wardian case with three others from Samarang, Java, had been planted out direct from the case on August 1st amongst the badly diseased coffee; it had been packed so that no injury accrued to it, and was altogether a satisfactory subject for experiment. I planted it in the evening of the day on which it was unpacked, shook a few spores from a neighbouring diseased plant on to one leaf, and moistened them with water; rain fell during the night, and the next day was wet up to the evening, hence the sowing was moist for about 24 hours at least. On August 18th there were one or two developing "disease-spots" quite visible to the naked eye, and on the 20th they were in full bearing. On August 7th the rain commenced in earnest, and was of a character exactly suited for the germination of the spores—warm, steady drizzling, continuing for hours, and saturating the air with moisture. This sort of weather continued to the 12th, and two fine and still days followed; then another wet period for a fortnight or so. The germination of the spores would be mainly effected between the 7th and 12th, however, and, according to my previous results, a "bad attack of leaf disease" should be apparent about August 30th to September 6th. It is just imminent; as I write this (September 2nd), there are pin-spots commencing to show on nearly every leaf:*

§ 10. From the sequence of events thus occurring on a small mass of coffee, more or less under control, it is not difficult to infer what takes place on larger areas such as estates, or groups of estates; but before examining this it is necessary to understand clearly a number of complicating circumstances.

Certain portions of most estates are subject to conditions of a more extreme nature than I have yet considered. The ravines and hollows are in some cases never quite dry, and it becomes a serious question whether the germination of spores is ever prevented in these places; continual evaporation from the water below keeps the foliage of the coffee moist, and, as such places generally possess very luxuriant and leafy trees, there is no lack of food for the fungus. The slightest shaking of the branches and leaves sheds spores around, and such hollows become quiet centres of disease, whence the wind periodically bursting in, further disseminates the spores. A similar argument applies in different degrees to flats where moisture is abundant from excessive dews, &c.

High and exposed ridges and faces are commonly badly diseased. This is partly because the wind conveys spores very readily to such places, and partly on account of the damp mists commonly enveloping them, and affording the moisture necessary to germination. The fact that such regions are usually much washed, and therefore afford poor soil for the roots of the tree, has no more direct bearing on the subject of leaf-disease than has the converse fact that the soil in flats and hollows is usually good.

Other things being equal, there can be no doubt that a gently sloping sheltered estate, or portion of an estate, suffers less than an exposed one, and if a dry climate is added to these advantages the difference is even more obvious. On the other hand, an estate through which the wind blows freely, and the rainfall and general moisture of which is high, suffers more. The understanding of these points is easy in the light of the other facts.

§ 11. And now, bearing in mind what are the conditions which rule an "attack of leaf-disease," I will shortly examine one or two further illustrations, taken from both sides of the coffee country.

My attention was drawn some months ago to a remarkable case of outbreak of *Hemileia* rust on a fine field of coffee situated in the following manner. The whole estate lies in an incomplete basin, open to the east, and sheltered by high forest-clad hills on the west, south and north sides. A steep ascent through jungle enables one to arrive at the top of the estate from the south-west side, and from this eminence one looks suddenly over the coffee on to the low country beyond. The position of affairs was as follows: the coffee to the extreme east of the estate alone suffered from "leaf disease," and all the rest of the basin nestling under the forest-clad sheltering heights had been free from "rust" until this year (this was in 1880). Could I explain the remarkable and sudden outburst of *Hemileia* on the south-west sheltered slopes?

During 1879 and 1880 much of the jungle had been cleared on the other side of the ridge, and on riding up to the estate one felt the force of the wind severely. I have little doubt that the destruction of this sheltering jungle, which had hitherto prevented the

* On September 9th these and numerous other disease-spots were spreading all over, and before September 30th almost every leaf on the above plant was badly diseased. The three other plants, however, which had been placed in the N.E. verandah of my house, showed *no trace of Hemileia* up to October 7th (the date on which I add this note).

carrying of spores (acting so to speak as a filter to the beating wind), now enabled free passage of them, and the consequence was an outbreak of "rust" soon afterwards. Other instances of the same thing are not rare, and indeed we must look upon the opening up of such large unbroken areas of more or less well prepared food to the fungus as one of the chief causes of its lamentable abundance.

On an estate in quite another part of the country, I found the natural features and their effects illustrated in another manner; the main fields of coffee lie on slopes chiefly facing the east and north-east, and widely open in those directions to the low country. Stretching upwards, and much broken in character, lay coffee estates for several miles in a westerly direction; the S.W. monsoon sweeps all these estates before arriving at a broad plateau or slight hollow which is situated at the top of the slopes referred to, and then, passing over the edge, falls down these slopes to the low country. Now this plateau, notwithstanding that it possesses fine coffee, serves as a kind of reservoir of fungus spores, and for the following reasons: the spores carried into it by the wind are very successful in obtaining a footing, since at that height there is usually sufficient moisture clinging about the coffee to enable them to germinate. Not only so, but every puff of wind sends spores produced hereon over the ledge to the slopes above referred to; these slopes are continually becoming infected, therefore, from above, and I have little doubt that were the plateau in forest instead of in coffee these effects would cease to a corresponding extent.

These examples may suffice to show how natural peculiarities of an estate affect its supply of disease-producing spores; but I would refer to other physical features, the action of which largely affect the question—in some cases masking, in others intensifying the ravages of the pest.

The "lie of the land," as planters term it, is closely connected with this, since so many other things are implied by it; but it matters not how an estate is situated, so far as *Hemileia* is concerned, provided the spores obtain access to the coffee, and moisture to germinate. An eastern aspect is often drier, less affected by wind, and, from these and other causes, possesses more luxuriant coffee than an estate facing the west; though in other cases the reverse holds good. But on going more closely into the matter, it occurs that a drier climate may mean less wash, and therefore better soil, which, of course, *cæteris paribus*, implies more luxuriant coffee; again, absence of wind entails obvious advantages when one looks on the damage done to coffee torn by cold, boisterous blasts, while beating rains are well known to wash soil bodily away.

Under such circumstances then, the natural advantages are all on the side of the coffee. Less *Hemileia* is blown into the place, and there is less continued moisture to favour its propagation, and therefore less chance of its spreading when once there; while on the other hand, soluble and valuable constituents of the soil are more abundant, and the coffee is consequently more luxuriant, and shows the ravages of what disease there is less evidently.

And this brings me to another, and very important point. It is commonly stated that strong, thick, luxuriant coffee suffers less than poor, thin trees with few leaves, and it is asserted that this is because the weaker coffee is more "susceptible to the disease" than the luxuriant trees—that the latter possess some mysterious power of "throwing off the disease." Facts, however, are against any such view.

A densely clothed tree, from the fact that it is not so easily penetrated by the wind, especially when supported by a number of others, may not become so much "diseased" in a given time as a thinner one, every leaf of which is reached by the wind-blown spores. Again, the dense leathery texture of a strong leaf depends on its tougher cell walls, and repletion with food, sap, &c., hence the mycelium may not make such apparent havoc with the tissues of its leaves in a given time as it does in the thinner, softer leaf of the more unfortunate tree; but there can be no doubt that the chief cause of the prevailing belief about luxuriant trees is that their ability to produce foliage more rapidly and abundantly partially masks the effects of the fungus by maintaining a general dark hue.

The characters of the soil, again, are continually quoted as having a direct effect on the fungus; but it will be seen from the above that, however much it may affect the coffee, good or bad soil only indirectly affects the fungus. It must be remembered that the mycelium of *Hemileia* requires *living material*, already manufactured by the plant, for its chief food. Of course, in so far as rich or poor soil enables the coffee tree to make this food, the mycelium present in the leaf is affected, and flourishes well or ill. So with other peculiarities of soil, &c. A damp, ill-drained piece of land may afford an advantageous position for the fungus spores, inasmuch as they there germinate readily; but it is less so for the mycelium when once established, because the nutrition of the coffee is affected by the sour sub-soil and other causes.

In this connection also come other complications. It is common to find "grub," "black bug," and other pests affecting coffee in damps, hollows, or on clay sub-soils, and I sometimes hear such remarks as that *Hemileia* is worse where "grub" is, and *vice versa*. Careful comparisons prove, however, that no connection other than an accidental one exists; the fungus may spread rapidly, it is true, on a field of coffee affected by "grub," because the foliage being thin and easily stirred by the wind, every facility for distribution and germination (such places being usually wet) occurs. But it is worthy of remark that a less vigorous mycelium is often found on such coffee, and that if a type of the fungus were to be selected, it were best got from a tree unaffected by any other pest.

§ 12. I have now shortly examined the natural peculiarities of soil, climate, &c., so far as they need be considered in this connection, and it is of course clear that numerous combinations of all degrees of these may occur. The same is true of that part of the work on a coffee estate which is under control.

Manuring is clearly effectual to a large extent in masking the effects of "leaf-disease," but *it is in no way a cure for it*, in the sense of diminishing the ravages of the fungus. Of every basket of proper manure now placed at the roots of the coffee tree, a certain proportion must be looked upon as serving the mycelium of *Hemileia* for food, after undergoing the necessary transformations in the plant; nevertheless, as experience shows, it is necessary to apply manure to enable the tree to produce and bear crop, and it therefore becomes the more imperative to understand the conditions of its action. Manure is usually applied either early in the season—I speak particularly of the districts to the south-west of Nuwara Eliya, &c.—to produce and support blossom, or later to "carry the tree through crop," as it is termed. That both methods have their advantages is undeniable, and where possible both might be employed, were it not for the expense. Indeed, what practically comes to this has occurred on a few estates, where the early manuring has been followed up by applications of lime when the young crop is on the trees.

Now, from what has been said of *Hemileia*, and its relations to the coffee, it is evident that one desirable object in the cultivation of the tree is to produce mature leaves *as soon as possible*, and to keep them on the branches *as long as possible*. The difficulties to be contended against are as follows: if leaves are produced in April and May, they become attacked by the fungus while still young, and in August and September the ripening crop is too often left bare on the branches. On the other hand, those leaves which were in bud in December are matured and well hardened when the fungus spores are blowing about, and have already enjoyed a much longer lease of life than the others.

But, unfortunately, it is in April and May that the growing season is usually at its height in these districts, and it is doubtful how far leaves could be put on the trees at an earlier date, unless the weather were very wet as in 1880, when the additional leaf was largely at the expense of blossom. Nevertheless, I would urge those planters who have the necessary climate to arrange matters so as to produce their leaves as far as possible either earlier or later than at present. The reasons why these districts suffered from such a "bad attack of leaf-disease" in July this year have already been detailed, and it will be noticed that when the winds commenced, a large surface of young and succulent leaves were ready to receive the spores of *Hemileia;* then followed the rain, germination of spores, and finally the fall of leaves as the fungus destroyed them.

Pruning should of course be arranged with the same object in view—to produce matured leaves during those months when least wind and damp may be expected. That some such object is kept in view by many planters would appear from the various kinds of pruning I have witnessed. A practical question of this kind must be decided by each superintendent on each different estate. The following hints may help to guide some, however.

The chief cause of the "failure of blossom" and the "dropping of crop" in all stages is the loss of the leaves, suddenly, and at critical stages: *i. e.*, at periods when the blossom or crop most requires the food manufactured by the leaves.

The leaves fall so suddenly, and in such large quantities, because the rapidly developing fungus is quickly spread over a large area of succulent foliage by the winds, at the time of the monsoon rains.

In so far as this large surface of young leaves can be produced at a period earlier or later than that during which the spores are being distributed by wind in such vast quantities, the trees will reap the benefit, since the disease cannot spread so rapidly, and the leaves will enjoy better health and consequently do more work for the trees.

I fear this can only be effected by pruning and applying the manure at times when they will act less rapidly than at present. It is clear that leaves are formed more slowly from January to March than from April to June, for instance (in the districts referred to); but the advantage gained by either having fewer leaves on the trees in May and June, or many hardened ones would probably be a decided one.

I am, of course, also aware that great difficulties stand in the way of a modified system of cultivation; not only difficulties with labour and estate routine, but also with the seasons. But in so far as the above ends could be attained, I believe advantage would accrue, and the manure would at least stand less chance of being wasted as food for the fungus.

Another point, already referred to in part, is shelter. There can be no question that coffee under artificial shade is spared a large infliction of wind-blown spores, and although such sheltered trees often tend to form foliage in excess of crop unless the season be hot and dry, it becomes an important question how far the visitations of *Hemileia* could be checked by belts of trees or other shelter. It is matter for regret that such immense, unbroken areas of coffee exist without break of any kind, and one can trace the swaying backwards and forwards of the spore-laden winds in consequence. A subject of some importance in this connection is the planting of other trees among the coffee; this is of course done to some extent in the case of Ceara rubber and Cinchonas, and although

the success of the experiment is not yet established in these cases, I would call attention to its general importance from the above point of view.

The value of a broad acreage of patana or chena land to the windward side of an estate is another illustration of the importance of any break in the onward career of wind-blown spores. Many planters have recognised the fact that they do not get leaf disease from the low-country patanas to windward, a fact worthy of remark in this connection.

This being so, it should be the aim of all to see how far the leaves can be kept on the trees by manure, artificial treatment, and cultivation, on the one hand; and how far the sources of infection can be lessened by the destruction of fallen leaves, and the prevention of spore invasions carried by wind from without. To those acquainted with the immense areas of open coffee under cultivation, and the difficulties of working steep and broken land, the practical application of hints to this end are admittedly very difficult; nevertheless, in face of the following facts it must be insisted upon that one of the most important steps in combatting the inroads of *Hemileia* is the destruction of fallen diseased leaves as speedily as possible.

1. A mature spore is capable of germination within 24 hours of its removal from the parent mycelium.

2. A leaf which falls while still green in parts may continue to shed spores for some hours after reaching the ground.

3. Ripe, dry spores retain their vitality for several weeks or even months.

4. Any of these spores blown from the ground on to the new flushes of leaves which become formed after the "general attack," &c., may become a new centre of disease in two or three weeks after germination.

I now pass on to the subject of the amount and kind of damage done by leaf disease to coffee—a subject already treated of at some length in former communications.

The Fall of Leaves, Flowers, and Crop.

§ 13. As I have already shown in a preceding report, and as is generally held proved, the most obvious damage done to coffee by *Hemileia vastratrix* is the periodical destruction and premature fall of leaves which it causes; if the leaves can only be kept on the trees for longer periods, the chief problem is solved.

Without insisting more in detail here upon the facts before published, and the additional proofs of the damage done now laid before you, I propose to examine a series of phenomena which at first appear extraordinary, but which a little reflection shows to be naturally consequent for the most part on the foregoing. The blossom of the coffee tree appears chiefly during the early months of the year in the districts south-west of Nuwara Eliya,* and this year an exceedingly promising series of blossoms was produced on most of the estates. Part of this blossom never came to anything beyond the stage of buds; another portion produced young fruit, but soon dropped off; while a small fraction furnished the crop now ripening up to a greater or less extent.

The following remarks apply more particularly to the districts above indicated; but the facts apply equally to other parts of the country as well, making proper allowances for differences in climate, seasons, &c.

The trees, which were recovering from the late "attacks of leaf-disease" in December and January, had commenced to clothe themselves with foliage in February and March, but were not generally luxuriant before April; by force of habit, so to speak, the flower buds became formed in the hot weather, and expanded as more or less luxuriant blossoms on shoots which were still struggling to produce leaves to replace those which had been lately lost.† That many of these early flower buds and flowers were poorly nourished on the still incompletely clothed shoots, is not surprising, and, in contrast with this, it appears that the March blossoms (which were generally better also), coming out on shoots already fairly well supplied with leaves, and rapidly forming new ones, were usually the successful ones. That this should be the case follows naturally from the fact that the latter blossoms and resulting young fruit had more material to draw nourishment from, more leaves being present at the time, and more time having been given for the storage of those food-materials which the young berries required.

I found also that the later blossom consisted mainly of finer flowers, better nourished and more vigorously developed as a rule. Not only so, but on a given estate there was more crop "set" on recently manured fields than on the fields which had received less liberal treatment; while comparisons over large areas convinced me that the same held true for trees on good deep soil, as opposed (other things being equal) to trees grown under poorer conditions.

* In some parts of Uva and a few other places, the coffee blossoms nearly all the year round, a fact of great importance in several respects; the picking is more expensive, but the trees are less exhausted by the distribution in time of their arduous task. One Uva planter tells me he has had 13 blossoms within 12 months.

† A correspondent to a daily paper wrote in June from Kotmalé to the effect that splendid blossoms were general, but a large quantity of the February blossoms were destroyed, and similarly in March. Then two small blossoms in January and one in April should have given crop. His experience is also to the effect that manured coffee did best.

But the statement that without leaves the tree cannot produce blossom and crop admits of more direct proof. In December, 1880, I stripped all the leaves from a tree on an estate in Hantané, and left it to recover as it could; the trees around proceeded to bear blossoms as usually in January, February, and March, but this particular tree was unable to produce a flower, all its energies apparently having been required to replace the leaves.* Here we see that the loss of leaves by the ordinary trees (caused by the November attack of leaf disease) being made up in time to enable the trees to produce blossom, only reacted to the extent described above; but the second loss, following on the first, in the example given, not only prevented the setting of crop, but even prevented the tree from blossoming at all. And so with other examples.

It thus becomes clear that, in the cases referred to, the blossoms produced at a time when the number and condition of the leaves did not afford adequate nutrition, only partially succeeded in producing the required fruit; while those blossoms which appeared later, and were better nourished, yielded more promising results in proportion as they *were* better supplied with food, &c.

I have devoted much time to the examination of the extraordinary phenomena termed by the planters "failure of blossom," and the following summarises the results arrived at. A certain proportion of incipient flower-buds did not come to anything at all, but formed at most yellow, sickly-looking protuberances which snapped off at a touch; in other cases the young buds opened slightly, and then "rotted off," passing through shades of yellow and brown to black. These buds and young flowers were peculiarly brittle, and their cells were full of brilliant, waxy-looking, dense protoplasm; the consequence was they would break or snap at a touch, and were in no way limp or shrivelled. In some cases the flower was more or less deformed, the style protruded and the corolla imperfect, and such flowers often rot away at the centre.

A large proportion of the flowers, however, apparently in all respects normal, became fertilized, lost the useless appendages, and the ovary remained to produce fruit; nevertheless the fructified ovary did not swell beyond an initial stage, but turned yellow and dropped off while little bigger than a pin's head; or, in other examples, it remained stationary for three or four weeks, and then either dropped or proceeded to swell up.

Another series of events may follow the normal fertilization and swelling of the ovaries of successful flowers, and render it by no means certain that the fruit will be matured. Many young berries turn yellow and sickly when little larger than a pea, and are detached with a mere touch; others acquire the normal size, and begin to turn orange and then shrivel up to a rotten or "light" brown mass. It thus appears that any estimates of the crops, founded on the amount of blossom, &c., were this year likely to prove fallacious; and that such has been the case is well known.

But it should be noticed that the falling of crop, when once it has begun to swell, depends on exactly the same kind of poor nutrition that was referred to before; for it is essential to note that just at the season when the crop is commencing to swell rapidly before ripening, another series of *Hemileia* attack come on—*i. e.*, at a time when all that the plant can supply in the way of elaborated food is required for the crop on its branches, the fungus comes at myriads of centres to rob it of this very material. Not only so, but by occupying space on the leaves, destroying their tissues, and shortening their period of activity, it prevents them from doing anything more for the tree; moreover, the profound disturbance of physiological relations which results affects the whole plant.

I have given details in an appendix note of the observations chosen to illustrate the above remarks; these may be compared with a sort of standard based on comparative examinations. I estimate that an average "cluster" of flowers (counting all the flowers produced during the year on both sides of the branch) contains 15 to 20 individuals, and that a good sample of "spike" or flowering twig supports 10 or 12 such clusters. We may assume, therefore, that a fair spike has 200 flowers on it in the season. (See Appendix.)

I gather from planters that 100 cherries per tree will give approximately one cwt. per acre, supposing the trees equal and at a common distance apart. I also learn that less than 15,000 cherries fill a bushel measure.†

Supposing the average coffee tree of 8–15 years old to bear ten primaries, each of which supports five secondaries, and that each of these fifty secondaries produced only five such spikes as have been described above; then we have each tree bearing 250 spikes of blossom. The startling conclusion is arrived at that each such tree has about 50,000 individual flowers on its branches in this season! It appears to have been a common event at one time for large fields of coffee to yield at the rate of 10 cwt. per acre, and such occurs in places now. If the above data are correct, the trees would give 10 cwt. per acre if only 1-50th part of the blossom came to maturity—*i. e.*, if each tree ripened 1,000 cherries.

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* Similarly with 20 trees stripped in December, 1880, and 40 stripped early in January, 1881: no flowers were borne by any of them though magnificent blossoms formed on all surrounding trees.

† I had a quarter of a bushel of cherries counted, and found 3,747; this would be nearly 15,000 to the bushel. In the Ceylon Directory, however, the number is given as 14,000, and this may be a better average. A planter who counted the cherries in ⅛ bushel, found 1,828: this gives a little over 14,600 to the bushel.

Hence we are driven to conclude that less than 100th part of the blossom becomes ripe crop, as a rule.

I am convinced that in some cases where not more than three hundredweights per acre will be picked, the trees produced blossoms as large as the above.

It is of course true that no one could expect so large a number of flowers each to produce ripe fruit; but the present state of affairs is not due to a mere crowding out of flowers or young fruit by successful competitors in a fair struggle for existence. The tree as a whole is poorly nourished from want of leaves, and no sooner does it make arrangements to replace this want than it is again denuded: that the visible effects of the damage should appear in the flowers and fruit is in accord with experience elsewhere.

There is a consensus of opinion among planters that the "tree is weakened," and that manuring enables it to "set more crop." In the sense I have insisted upon, the tree may be considered "weakened," that is to say, it is capable of supporting less crop; but it still puts forth immense energies periodically to replace the lost leaves by new ones. That more blossom was successfully "set" this year on manured coffee than on trees poorer in food material, is therefore not to be wondered at; just as little surprising is it, also, that coffee in deep good soil in a drier climate, and which had been less harassed by *Hemileia*, should produce good crops.

SEC. III.—REMEDIAL MEASURES.

§ 14. In considering the question of remedial measures it is necessary to apprehend clearly the nature of the problem to be dealt with, and this is by no means a simple matter. It has become a popular error to suppose that the discovery of some chemical which will destroy the fungus is the chief aim of investigation; this is, however, the simplest of all the questions to answer, and indeed no such chemical could be of any use so long as the following points remained undecided:—(1) When should the fungus be assailed? and (2) How often would it be necessary to apply any external remedy? But however cheap and easy the application of any reagent may be, and however efficacious the chemicals used, it is clear that care must be exercised in treating such an organ as the leaf of a permanent plant like coffee so as at the same time to produce in contact with it a continuous and readily diffused body strong enough to kill the fungus without hurting the leaf or tree.

Much of my time during the earlier portion of this year was employed in watching the effects of certain chemicals on coffee and on the fungus, and numerous experiments with all kinds of reagents have convinced me of the following facts. In devising any direct mode of attacking the fungus, some rapidly-produced, fairly soluble material must be employed, so as to be already on the leaves at a time when the spores are germinating.

At this period the delicate tubes are easily destroyed and offer hardly any resistance to weak caustic or poisonous solutions; but they are formed so rapidly and enter the stomata so quickly that any application must be already on the spores when they emerge. No attempts to attack the internal mycelium have succeeded in the slightest degree, and statements to the effect that the mycelium was prevented from producing spores by the absorption of reagents through the stem are not supported by the evidence. Unless the germinating spore is destroyed before the tube enters the leaf, nothing short of injury to the leaf need prevent the mycelium from producing spores again as described.

A suggestion to bring about lateral absorption of carbolic acid through the cambium of the tree, and in some supposed manner to attack the fungus from within, was met at the time with the necessary proofs of its erroneous nature. It was, however, attempted on several patches of coffee trees, with the results predicted—injury to the trees and no diminution of the disease spots.

The greatest difficulty of all in this connection is presented in the fact that the fungus spends nearly the whole of its active life in the tissues of the leaf. In common with other such parasites, its life is apparently so arranged that *as short a time as possible shall intervene between the well-protected spore-condition and the safely ensconced mycelium.* It is clearly a condition of success, therefore, that the reagent be on the spore at germination.

A second essential is that the whole of the spores be destroyed, since I have shown how rapidly a single spore may reinfect a leaf, and its progeny spread on to neighbouring trees. This important condition demands two properties on the part of the reagent used, (1) that the chemical employed shall rapidly diffuse and reach every corner of the plant, &c., and (2) that it shall be continuously evolved or persistent in its action. The first of these conditions absolutely precludes the use of any liquid, in the opinion of most planters, since the distribution of such cannot be carried out thoroughly without greater expenditure of labour and money than are forthcoming for the purpose. As to the second condition, the difficulties are very great, since few substances or compounds can be suggested which will at the same time readily diffuse and yet persistently carry on the work required. Nevertheless, no substance is of any use that will not act persistently, for we have seen that the rapidly-germinating spores are continually being brought by the wind, and the tubes produced as continually entering the stomata of the leaf during the rains, &c.

And here a fresh difficulty arises. To meet the requirements of the case, the reagent must be soluble, and yet the time when it is most required to be active is *when the rains are continuously dissolving it, and running off with it in solution to the ground.* This being so, one must also be doubly careful in selecting nothing which (or products of which) may do harm to the tree on being washed into the soil around the roots.

All the mineral or metallic poisons, such as salts of copper, zinc, antimony, &c., are therefore useless for the purpose, though fatal to the fungus. Either on account of their prime cost, or danger and difficulty of application, &c., the following chemicals, though readily killing the fungoid tubes, must also be placed out of account: acetic acid, osmic, chromic, and other metallic acids; bromine and iodine and compounds, hydrocyanic and other organic acids of like nature.* This rapidly brings the list of available reagents down to a limit, and it appears clear that the possible chemical must be selected from among the following: sulphuric acid and compounds of sulphur, nitric acid, hydrochloric acid and compounds of chlorine, and carbolic acid. Ammonic, potassic and sodic hydrates also kill the tubes effectually, as do strong solution of common salt and other similar compounds.

Nevertheless, very few of the above are available, since most of them would have to be applied in a liquid form, or are in other ways unsuited. Some compound which will continuously evolve an easily diffused, readily soluble gas, forming with the water on the leaves a solution sufficiently strong to do the maximum of injury to the germinating spores, and the minimum of harm to the coffee leaf—the after-products of which are not injurious to the tree when washed to the roots—such is the desideratum

Carbolic acid is not sufficiently soluble and diffusible for the purposes required, and its highly caustic and irritant characters make it a very dangerous reagent to put on living coffee trees. Nevertheless, I shall refer to experiments where it has been largely used in a certain form. Its great cheapness, of course, commends it.

Chlorine compounds are not available. The caustic nature of "chloride of lime" brings about the destruction of the leaf tissues, while the passage of gaseous chlorine, hydrochloric acid, and other allied compounds into the stomata is fatal to the tree.

Considering all the facts, I find sulphurous and allied acids the best and most available reagents yet suggested for the destruction of the fungus on the coffee; and of all the methods for procuring the destructive gases, there are none to equal that proposed some time ago—the interactions of sulphur and freshly-burnt lime on the moist leaf—and for the following reasons:—

(1) The mixture is slowly continuous in action for a long time.
(2) The slowly-evolved gases distribute themselves rapidly by diffusion.
(3) The chief gases are very readily dissolved in water.
(4) The solution formed is strong enough to kill the germinal tubes, but too weak to injure the leaf.
(5) The acid solution does not concentrate to a dangerous strength, since it is continually being absorbed by portions of the lime, and the compounds become further oxydized to neutral or nearly neutral salts.
(6) Not only are the final products harmless to the tree, but the chief one (sulphate of lime) is a valuable manure.
(7) The mixture is simply and readily applied by coolies' hands.

It is therefore evident that sulphur and lime, evolving sulphurous gases on the surface of the leaf, &c., comply with most of the requirements above commented upon. Having decided upon the best reagent, and the time to apply it, it remains to examine another very important point, viz.:—what is to be used as a measure of success in the experiments?

In more or less preliminary trials with lime, or sulphur and lime, I was much impressed with the fact that every one relied on the general impressions created by simply viewing the coffee from time to time. This admits of too much chance of fallacious conclusions where a small difference may be of importance, and I accordingly tried to get rid of subjective sources of error by the following scheme.

Since the reagent, by destroying germinating spores, should give the leaves on which they were germinating a longer lease of life, so to speak, if the trees are equal in other respects, the treated specimens should possess more leaves than those not treated: this being so, we can decide whether any resulting darker shade is due to an increase in the number of leaves or to some other change produced. If the leaves, however, remain longer on the tree, that tree should drop less crop: and hence the second test. Other checks to the work will be noticed below.

A number of preliminary experiments with lime, sulphur and lime, carbolic acid, &c., may be passed over as not yielding sufficiently definite results, or not having been performed at the proper time. Of my own numerous preliminary trials, I shall only quote those which throw direct light on the matter; but I here take the opportunity of thanking several gentlemen for the aid afforded me, either by the practical application of my suggestions, or in giving me valuable hints derived from their former experiences.

* I omit here all mention of many other expensive bodies.

The first experiment on Harrow Estate.

§ 15. Mr. Anton, of Pundalu-oya, has been good enough to give me the following account of an experiment carried out by him on Harrow estate in 1879-80, and which from the results obtained, he felt encouraged to repeat during 1880-81.

Sulphur and lime were applied on an area of coffee of a certain acreage from July 20th to August 12th, 1879, and the results compared with what happened on another area of similar coffee. Both the treated and non-treated fields were considered equal as regards soil, exposure, altitude, &c., and both had been well manured in May, 1878. At the time of application both areas were badly rusted with *Hemileia*, and presented a good crop, which it was feared would not all be picked on account of the known tendency shown by diseased trees to drop crop.

During October, 1879, to January, 1880, the crop was picked, and it was found that the sulphured coffee bore about 6 cwts. per acre, proportionally little light, while the non-treated area only gave 4 cwts. per acre and twice as much light. Mr. Anton suggested that the difference was due to more leaves having been kept on the trees by the treatment, and it will be seen that such was no doubt the case: the explanation of this may be deferred until the second experiment on Harrow has been described.

The second experiment on Harrow Estate.

§ 16. After the results obtained in 1879-80 it appeared desirable to repeat the experiment of applying sulphur and lime to the coffee at a time when the rust had already made its appearance. I undertook the task, therefore, of watching a second attempt, and of examining the results as it proceeded.

A series of fields of coffee, covering 32 acres, and forming an irregular oblong block, were selected for the experiment: on 24 acres were applied sulphur and lime in the proportion of 1 to 3. The mixture was thrown in by hand at the rate of about 4 oz. per tree. The other eight acres remained untouched. This field of eight acres lies below the bungalow, and slopes chiefly to the north-west; the sulphured fields lie south and east of the bungalow, and are somewhat broken by ravines and roads.

All the coffee was about 24 years old, and bore but little crop last year. The soil is somewhat loam-like, though not heavy, and numerous boulders and rocks—not calcareous—are interpersed among the trees. The higher parts are washed, and therefore possess rather poorer soil than the lower. The untreated coffee was, on the whole, slightly better in point of position and soil than the bulk of that sulphured.

The climate is described as wet in the S.W. monsoon, but, considering the elevation (3,500 to 4,000 ft.) hot, and especially so among the rocks. The weather during the early part of 1880 was exceptionally wet, and much blossom was lost. June, 1880, was tolerably fine, but July decidedly wet.

The treatment of the coffee had been liberal, the manuring commencing in December, 1878, and being completed in March, 1879. The application of the manure was made from below upwards, cattle manure, &c. (two baskets per tree) and castor cake and bones (1¼ lb. per tree) being the ingredients used. On this account, the lower (unsulphured) portion "had a better early blossom set" from being manured at an earlier date, and consequently carried a little more crop at the time of the commencement of the experiment than the higher parts of the sulphured area. When the experiment was arranged (August, 1880) the position of affairs stood thus:—Crop advancing. Still some six or eight weeks of S.W. wind to be expected (blowing over the *unsulphured* coffee before reaching the treated fields) and occasional rains of course.

The objects of the experiment were: (1) to save leaves, by preventing the entrance of germinal tubes, &c.; (2) to see what proportion of leaf and crop existed after a certain period; (3) to see if the quality and quantity of the "cherry" or "parchment" differed on the two areas.

The sulphuring was commenced on August 9th, but had to be suspended on account of wet weather: leaves sent to me on August 14th demonstrated the destructive effects at the time of this partial application. On August 18th the sulphuring was recommenced early in the morning in my presence, and I spent two days examining the effects on leaves with which sulphur and lime had been in contact for a period varying from five to forty hours. A strong and irritating odour proved the presence of the sulphurous gases, and there was no room for doubt as the destructive effects of the reagent on the various fungal filaments and on the spores and germinal tubes of *Hemileia*.

The interval from August 20th to August 30th was fine, and the penetrating gases made havoc with the fungus on all sides. Then came the rain, and from September 1st to September 12th very wet weather prevailed. There can be no doubt that the chief destructive effects of the sulphur were made evident before this, and that very little, if any, results in this direction occurred later.

On September 12th Mr. Anton wrote to me to the effect that the "disease" was reappearing on spots here and there: this must have arisen from spores which germinated at the end of August; whether from odd spores which had been missed, or which had been blown on since, it is impossible to say.

On September 27th I again visited the coffee, and could detect little difference; everywhere was a fairly filling crop, and picking proceeded rapidly. Microscopic observa-

tion demonstrated the presence of new fungal filaments and spores of *Hemileia*, &c., on the leaves, and it was plain that the coffee was "re-infected."

On November 19th the sulphured area looked darker than the other, and fewer trees could be detected which were evidently suffering from crop. Little disease appeared anywhere. On November 25th, however, another outbreak of disease was apparent, though it did not become bad.

On December 20th my notes run to this effect: "I am convinced that the sulphured patch looks darker."

Before proceeding to give the details of the tests used to decide what had occurred, I propose to examine the results of preliminary experiments, which help to throw light on the matter.

A number of coffee plants were sulphured in the nurseries in July, 1880, before planting out. These were about one year old and had no primaries, and had been pricked out from among the coffee in July, 1879.

Another series of plants, put out in June, 1880, had not been sulphured before planting out. These were nearly two years old, and had three pairs of primaries each: they had also been carried a short distance before planting, but had been placed in the field a month earlier than the preceding.

In August, 1880, Mr. Anton drew my attention to the fact that although the two-year-old stronger plants had been three months in the open, they possessed fewer leaves than the others, which were only one year old and had been planted out only two months, and he attributed the difference to the effects of the sulphur, believing that the treatment had kept a larger number of leaves on the plants.

On counting 500 of the *unsulphured* plants, we found the total number of leaves which they possessed was 2,544—*i. e.*, an average of about five leaves each. An equal number of sulphured plants gave 3,165, or an average of about six leaves each.

From observations on carefully-sheltered plants grown from seeds, and put out as above, I find that a healthy one-year old plant should have about 60 leaves, and a two-year-old probably more than 250. This being so, the difference between the above plants is much larger than appears at first sight, the sulphured plants possessing six leaves out of a possible 60, or 10 per cent.; and the others only five in 250, or 2 per cent.

From the known properties of lime and sulphate of lime, from analyses of coffee and coffee soils, and from the experience of several planters who have used slaked and caustic lime alone on coffee lands, it is clear that lime in general is a valuable soil ingredient to Ceylon coffee, and it becomes a question of some importance, how far the success of the Harrow experiment may have been due to the various actions of lime with respect to coffee and coffee soils.

Experiments demonstrate that the foliage of coffee becomes darker after caustic or partially slaked lime is added to the soil and forked in, and it is on record that decided benefit has resulted from using sulphur and lime amongst the manure applied to the roots of the tree.

I now proceed to examine the Harrow experiment on its merits, as an attempt to cope with leaf disease and obtain more crop.

The crop picked from the 24 acres (sulphured) on the one hand, and that from the eight acres on the other, were kept separate, and a return made showing: (1) the actual quantity of ripe "cherry" (fruit) obtained from each; (2) the amount of "parchment" (pulped beans) which this gave; and (3) the proportion of "light" or bad beans yielded.

The 24 acres (sulphured) gave 1,168 bushels of ripe "cherry," or at the rate of 48½ bushels per acre; the fruit from the eight acres (unsulphured) measured 291 bushels—*i. e.*, at the rate of 36⅓ bushels per acre. Hence very nearly 12 bushels per acre more were obtained from the sulphured area than from the other. The "out-turn" from the 1,168 bushels of sulphured coffee was 548, or nearly 47 per cent.; that of the 291 bushels was 184, or nearly 63¼ per cent.; thus, the unsulphured coffee gave a better out-turn. But the difference in "light" coffee is most remarkable. The 1,168 bushels of sulphured coffee yielded 12¼ of "light," or nearly 2·235 per cent.; whereas the 291 bushels gave 9—*i. e.*, 4·891 per cent. In other words, the light coffee from the unsulphured area was more than twice as much per cent. as that from the treated coffee.

The unsulphured coffee, therefore, (which started with no disadvantage, but rather the reverse, considering that it was below the bungalow, on better soil, and manured two months earlier) ripened less crop and produced much more light coffee, though the out-turn was superior in the proportion 63 : 47 per cent.

COFFEE LEAF DISEASE.

THIRD REPORT.

A sample of each coffee was sent to Colombo, and cured separately; each sample measured 9½ bushels, and it will be seen that a slight difference obtains still in favour of the sulphured coffee :—

HUNUPITIYA MILLS.

Colombo, 27th January, 1881.

E.—Sulphured. MEMO. of Coffee ready for Shipment.

Mark and Estate.	Nos. on Casks and Barrels	Casks.	Barrels.	Tins.	Size.	Nett.		Total.			
						lb.	oz	Cwt.	qr.	lb.	oz.
1 E	...	...	1	...	1st	41	0				
2 „	...	...	1	...	2nd	105	0				
3 „	...	.	1	...	3rd	69	0				
P „	...	...	1	...	P	20	0				
								2	0	11	0
T „	...	...	...	1	T	9	0				
								0	0	9	0
	coffee	...	..	1	...	1	11				
	and brown	...	...	1	...	0	5				
								0	0	2	0
			4	3				2	0	22	0

HUNUPITIYA MILLS

Colombo, 27th January, 1881.

F.—Unsulphured. MEMO. of Coffee ready for Shipment.

Marks and Estate.	Nos on Casks and Barrels	Casks.	Barrels.	Tins.	Size.	Nett.		Total.			
						lb.	oz.	Cwt.	qr.	lbs.	ozs.
1 F	...	...	1	...	1st	45	0				
2 „	...	...	1	...	2nd	100	0				
3 „	. .	...	1	...	3rd	60	0				
P „	...	...	1	...	P	22	0				
								2	0	8	0
T „	...	...	...	1	T	11	0				
								0	0	11	0
Pieces	coffee	1	...	...	...	1	13				
Black	and brown	1	...	...	...	0	5				
								0	0	2	2
			4	3				2	0	16	2

As I cannot do better than make use of the accompanying remarks on the above, Mr. Bois's letters are published with his permission :—

Colombo, 1st March, 1881.

MY DEAR MR. WARD,—I have this morning had a long talk with Mr. Anton with regard to the experiment upon the Harrow Estate, and he mentioned that you were somewhat puzzled with the out-turn of the coffee in Colombo, and Mr. Symons' report thereupon. Now, I do not think that they are in any way unfavourable to the coffee (marked E) which had been treated with sulphur and lime. It is true that the F unsulphured sample had a smaller proportion of small size; but, on the other hand, the bean of E might have been of closer texture (and therefore of better quality) seeing that the out-turn of clean coffee from the parchment was 4 27 in the case of E, and only 4·39 in F. If the bean had been smaller and the out-turn worse, I should give my opinion against the sulphur and lime, but in the present instance I am not disposed to do so. You will notice also that in the sample F there is a larger proportion of Peaberry, and although this quality is prized it is, I believe, the result of impaired growth. As regards the colour, there was certainly a difference, but so slight as to be almost inappreciable. Mr Symons was a little doubtful about it at first, and it was not until we had both carefully examined it in the same light that we came to the conclusion that there was a difference. I should not like to say that the E mark was inferior, or that the slight difference in colour was sufficient to influence the price; in fact, I do not think it would do so. You must take my remarks for what they are worth, but, so far as I can judge, the experiment on Harrow is by no means discouraging.

Yours faithfully,
FRED. WM BOIS.

Colombo, 3rd March, 1881.

MY DEAR MR. WARD,—I have no objection whatever to your using my letter if you find it desirable.

I attach considerable importance to the difference of 6 lb. in 240 lb. parchment, as it is equal to 2½ per cent. I also attach importance to the difference between 2½ per cent. and 5 per cent. of light coffee.

Yours truly,
FRED. WM. BOIS.

Besides the above reports on the samples, I sent marked packages of each to several firms in Colombo, and must take this opportunity of thanking those gentlemen who took so much trouble with my samples. I was anxious to see if experts could detect any important differences in the parchment, and the samples sent were simply marked with letters. Examples of the opinions given are selected as follows :—*

(1) "I am of opinion that the F† is slightly superior in colour and brightness to E: it is of a brighter, clearer, bluish-green than E, which has a decided brownish tinge; but both are extremely fine samples. The F is a larger coffee, but contains more triage than E, and the out-turn is consequently worse, but equal quantities of the bulk size were in the following proportions :—134·8 F to 131·3 E, or 2 4 per cent. in favour of F, which I pronounce decidedly superior, as far as the good coffee is concerned, to E, E being one per cent. better than F as regards triage."

(2) "A‡ is about 1 per cent heavier than B, and the beans were better in colour and fuller in size when peeled as compared with the parchment."

(3) "The coffee look *very* similar, but the A has a larger proportion of "0" size, "1" size, and Peaberry, the most valuable qualities, while B has a much larger proportion of No 2, the smallest size. On the other hand, A has a slightly larger proportion of blacks and browns, but we could not tell whether this would be the same in a larger sample, although we may mention that the A showed a good many more pickings of this description than the B in the two samples of parchment sent down before."

(4) "500 cubic centimetres of A weighed *nett* 227·35; 500 cubic centimetres of B weighed 224·35."

(5) "Both the samples are of exceptionally good quality, far superior to the bulk of this season's crop, and the coffee appears to be almost free from diseased beans, which are now so prevalent. * * * The only difference we can discover in the two samples is that A is rather a deeper colour than B, but both coffees would obtain the very highest prices of the day."

(6) "The slight difference in the colour of the two samples of coffee you sent would not affect the selling value."

(7) Sometimes I think A a shade better than B, but cannot make up my mind about it."

(8) "They are both fine samples of coffee in parchment, and would probably give a very good out-turn; they peel a long, well-shaped, close bean, such as is much sought after by buyers. Of the two, perhaps B contains beans slightly larger than A, and smaller too, being scarcely so regular as A. In colour the samples appear alike—both fine."

After the completion of the experiment on Harrow it was not an easy task to determine exactly the effect that had been produced on the trees. It was argued that the darker colour of the sulphured area might have been due to the manure, in conjunction with sulphate of lime, &c., having benefited the trees more than the manure alone: or it might be due to the immediate action of caustic lime on the manured soil having rendered certain useful ingredients rapidly available; or, finally, it was probably due to the fact that more leaves had been kept on the trees by the destruction of the fungus in August. On December 20th, therefore, I tried to decide this question by stripping the leaves from ten trees on each area, and ascertaining the average number of leaves per tree. The following tables give the results:—

A.—UNSULPHURED COFFEE.

State of Tree as regards Crop, &c.	Number of primary Branches.	Number of full-sized Leaves.
Heavy crop, thin tree ...	18	518
Do. ...	8	218
Fair crop and tree in fair condition ...	4	974
A fine tree ...	8	1,300
Do. ...	10	1,300
Fair crop and in good condition ...	9	966
Small crop, tree in good condition ...	13	1,800
Heavy crop and badly diseased all over ...	13	370
Small crop, fine condition ...	12	2,295
Heavy crop, fair ...	10	858
	105	10,599

B.—SULPHURED COFFEE.

State of Tree Crop, &c.	Number of Primaries.	Number of full-sized Leaves.
Small crop, tree diseased ...	10	1,010
Fair crop, good condition ...	10	1,400
Do. ...	10	650
Small crop, fine tree ...	14	1,900
Heavy crop, tree "shuck" ...	21	438
Heavy crop, fair tree ...	9	475
Do. ...	9	337
Fair crop, good condition ...	11	676
Do. ...	14	998
Heavy crop ...	13	778
	121	8,662

* Each of the numbered paragraphs gives the opinion of an independent expert.
† F = Unsulphured coffee; E = sulphured. ‡ A always = Unsulphured coffee; B = sulphured.

COFFEE LEAF DISEASE.

THIRD REPORT.

On comparing these tables it will be seen that the trees not sulphured had more leaves in the proportion of 10,599 : 8,662. On considering the matter further, and comparing the trees selected, it occurred, however, that had we selected trees less irregular in point of size, condition, number of primaries, and other respects ; and moreover, had we counted *all* the leaves, instead of selecting only those which were considered full-sized (a difficult thing to determine properly) the results might be different.

Since I was very anxious to get at the truth of the matter, a number of preliminary attempts were made to select some fair standard of comparison. It was decided to select trees each of which possess 10 uninjured primaries, to count all leaves more than two inches in length, and to *weigh* the leaves as well as count them.

On December 21st the trees were selected and stripped, the leaves put into baskets, and weighed and counted while fresh. The results were :—

A.—Unsulphured Coffee.		B.—Sulphured Coffee.	
Number of Leaves over 2 inches long.	Weight of the Leaves.	Number of Leaves over 2 inches long.	Weight of the Leaves.
2,868	4½ lb.	3,396	4½ lb.
2,590	3¾	2,734	4
1,548	2½	1,330	3
724	1	836	1
658	1	1,318	3¼
852	1¾	940	1½
672	1	690	1
638	1	454	0½
570	1	1,028	1½
2,302	4	2,596	5½
13,422	21¼ lb.	15,322	25¾ lb.

On comparing these we find the unsulphured coffee averaged 1,342·2 leaves per tree ; the sulphured 1,532·2. The weight indicates about 631 unsulphured leaves to the pound, but only 599 of those sulphured.

On January 20th, 1881, these observations were repeated with the same precautions, and the following were the results: —

A.—Unsulphured Coffee.	B.—Sulphured Coffee.
No. of Leaves over two inches long.	No. of Leaves over two inches long.
1,892	2,266
1,186	1,700
1,469	1,066
1,032	1,318
896	792
1,398	2,715
1,036	1,118
1,836	1,268
2,332	1,980
1,762	1,100
14,839	15,323
Total weight—15 lb.	Total weight. 8¼ lb.

Comparing again, it appears decided that the darker colour of the sulphured coffee was (in part, at any rate) due to the presence of more leaves in the proportion of about 1,532 leaves per tree, against about 1,484, and that there was more matter in the sulphured leaves, which only took about 839 to the pound, against 989. The chief reason why both sets of leaves weighed less than in December was on account of the drier weather prevailing at the time of the January experiment.

Before discussing this matter further, I will conclude the account of the Harrow experiment. The cost, I am informed, was Rs. 20·47 per acre ; sulphur at Rs. 190, and lime at Rs. 25·25 per ton in Colombo. It was found that seven men, carrying about half a mile, could apply the powder to one acre per diem.

It appears from the foregoing that sulphur and lime applied at the critical period, when the germinating spores of *Hemileia* are treatening to denude the trees laden with crop, prevent the fall of leaf to a certain extent, and for a short time by destroying spores and germinal tubes, and that no harm accrues to the coffee from the after product ; but it must also be pointed out that either from the action of the lime alone, or from salts of sulphur and lime as well, a distinct benefit to the trees is obtained as the results of the absorption by the roots of the compounds dissolved in the water in the soil.

The Pérádeniya Experiment.

§ 17. In order to have a second experiment performed of the same nature as that on Harrow, a piece of coffee was selected on Pérádeniya estate in June, 1881, and half the piece treated as before.

The coffee chosen covers a narrow, oblong tract of about 16 acres; it is described as good coffee, and at the time the experiment began had a fair crop on the trees. A great deal of trouble was spent in obtaining equal areas for experiment, as the ground is somewhat broken by hollows, ridges, and patches of grass or stones.

A line was marked by driving stakes into the ground, dividing the 16 acres longitudinally; the half which was treated lies generally to the north of the other half.

The sulphur and lime were applied on July 6th, 7th, and 8th, and the experiment was completed on the 16th, rain having come on and interfered with the application.

The whole area is fairly sheltered, but the S.W. blows across the lower end as if from S. to N., therefore blowing across the unsulphured patch first.

The soil is stony and light as a whole, and somewhat shallow in places; and the coffee is somewhat old. Leaf disease was becoming very bad when the experiment began, and much "rust" was present on the leaves.

The area was manured with bulk (cattle and poonac) in January, 1880, and gave little crop last season.

On July 15th no change was discernible; the field was yellow with rust, and the sulphur and lime first put on were washed largely to the soil by the rain. Examination of given leaves demonstrated the activity of the reagent.

On July 26th I again saw the coffee. Many leaves were falling in the hot, dry weather, and although *Hemileia* was still abundant, the manager (Mr. Huxley) thought the strip was looking better.

During the first week in August the bad leaves had fallen for the most part, and the new leaves were already making the coffee look darker; but at the end of the month a decided though slight difference in colour could be detected on either side of the line of stakes: this was most evident on one of the later treated parts.

About the middle of August, however, a fresh "attack of leaf disease" had broken out all over the field, and it became clear that the benefit, so far as external application was concerned, would be partial and temporary.

This follows, also, from the other facts. In applying sulphur and lime on July 8—16, those spores and tubes were destroyed which would have produced spots about August 1st and later. The rain, however, broke into the experiment (and it is clear that no application could be made then) while spores did not cease to arrive and break forth from mycelia already inside the leaf, and the consequence was a new outbreak about the middle of August. Of course the good done made itself visible; germination was, at least, to some extent, delayed, and the cleaner leaves showed forth and darkened the colour.

It remains to be seen how much benefit will be derived from the experiment in the end. The crop from each field is being kept separate, and it will be pulped, &c., separately. This cannot be decided before the end of the year. I am strongly of opinion that the darker colour, which is now increasing, is due to the action of the lime on the soil, and the absorption of lime and sulphur salts, &c., by the roots.*

Experiment on "Belgravia" Estate.

§ 18. Acting on suggestions derived from preceding experiments, the following plan was adopted, and Mr. Elphinstone kindly undertook to have it carried out on Belgravia estate, Lindula.

A square of coffee was selected in April, consisting of trees as equal as possible and situated on a flat surrounded by sheltering hills. About 100 trees were enclosed in a square of canvas arranged as follows: stout posts driven into the earth at intervals of a few feet supported two lengths of canvas or ceiling cloth three feet wide, carefully nailed on and joined. Hence the enclosing wall was six feet high.

The wind of the S.W. monsoon comes in at one corner, and blows diagonally across the square. The soil is fair, but somewhat moist at this spot. All the leaves and prunings were carefully removed from the enclosure, and leaves were buried in the soil.

The enclosure was completed in May, and a considerable number of "rust-patches" were already on the leaves all over the enclosed and surrounding coffee. On May 18th the whole inside of the enclosure was treated with sulphur and lime, thrown by hand into every tree, and on the logs, ground, and canvas. Microscopic examination demonstrated the destruction of the germinating spores as before.

At the end of June the enclosure showed no marked difference to the unaided eye, and it became clear that the disease was very little reduced inside the square.

On August 13th I again visited the enclosure. Looked down on from above, the colour of the coffee was darker under the lee of the corner where the wind caught the square, and became paler towards the opposite corner. Careful examination showed that the trees in the more sheltered corner had less rust on the leaves than those in the opposite corner:

* The results will be watched and reported upon, if necessary, at the end of the season.

at the same time no one could undertake to say that the most diseased corner was more free from the rust than the coffee immediately outside and partially sheltered by the whole square.

It was perfectly evident, in fact, that whatever good had been done by the application of sulphur and lime on May 18th, it was only a transitory benefit: the coffee had become re-infected, and was nearly as bad as ever. In short, one application of the reagent was clearly shown to be insufficient.

On reflection, and as the facts already detailed in this report became known, the explanation of this disappointing fact revealed itself to the following effect:—

1st.—It is clear that those germinal tubes which were already in the leaf when the application was made were safe from the effects of the reagent, and would produce spores (according to the knowledge now to hand) some fortnight to three weeks later. Hence there would be the means of re-infection already inside the enclosure unless the sulphur and lime acted long enough to catch the new spores also. This it did not do at that season, being largely washed off during the monsoon rains.

2nd.—These newly-produced spores would germinate in the rains and their tubes enter the leaves forthwith, and within another three weeks—*i.e.*, six weeks after the original experiment—produce a second stock of spores. It must be remembered that the six-feet wall of canvas could not prevent some motion of the trees by wind and a consequent shaking of the spores on to surrounding leaves.

3rd.—From the fact that the corner of the square furthest removed from the point where the S.W. wind first touched the whole, was most diseased on August 13th, two conclusions might be drawn: either the greater shaking of these trees by the wind enabled the spores they produced to fall more freely around, and therefore to infect more leaves than was possible among the trees in the sheltered corner; or, the greater amount of infection was due to the advent of spores derived from without, the wind passing over the sheltered trees having dropped spores into the more exposed corner and provided for more disease spots in proportion.

Examination of the canvas demonstrated that the last explanation holds good. I took pieces from both the upper and lower portions, and found numerous spores of *Hemileia embedded in its meshes*, and in all stages of germination and decay, as well as quite recently blown and fresh specimens.

The Belgravia experiment, therefore, may be held to prove, (1) that one application of the reagent can have no effect lasting more than two or three weeks;* (2) that re-infection takes place from surrounding coffee in a very short space of time, by spores carried bodily through the air or shaken off from the leaves immediately around.

The Experiment on Wallaha Estate.

§ 19. The experience derived from the observations on Harrow (and also on Kataboola, Mount Vernon, and other estates) made me anxious to apply the same methods to coffee where unslaked lime *alone* had been used; and this I have been enabled to do through the kindness of Mr. Talbot, who has undertaken to carry out an experiment arranged as follows.

A field of known area has been divided into two equal longitudinal halves, and in August, the crop coming on rapidly, freshly-burnt lime was strewn all over one-half for the double purpose of killing all spores with which it comes in contact, and to serve as a top-dressing which will rapidly make its way to the roots. The crop will be picked and pulped separately from the two areas, and it will then be possible to determine how far the success in the Harrow experiment depended upon the lime used.

The experiment now proceeding on Pérádeniya will serve as a further check, since the mishap of rapid and continuous rain turned the application, practically, into a top-dressing of sulphur and lime salts for the most part. I contemplate reporting on both experiments when concluded, if results of sufficient importance are obtained.

Experiments with Carbolic Acid.

§ 20. I had already satisfied myself that, taking into account its slow diffusibility and the danger of using it on a living plant, carbolic acid is not available for the purposes of the planters, when, in January last, I was invited to be present at an experiment of a novel nature. Wrappers were loosely tied around the stem of the tree enclosing a mixture of carbolic acid, water, and mud between the wrapper and the bark of the tree. Under the erroneous supposition that the cork-clad bark and the cambium could absorb the liquid with benefit to the diseased tree, the object of the inventor was declared to be to "deal with the disease after it has entered the leaves." I pointed out the reasons why this could not succeed, and also took occasion to insist on the dangerous properties of carbolic acid in connection with living coffee.

Some months afterwards the ill-effects of the treatment were still visible on trees at Pallekele, Roseneath, and Pérádeniya estates. The caustic liquid having destroyed a more or less complete ring of bark, cambium, &c., had injured each tree to a corresponding

* I doubt whether the effect lasted more than one week.

extent. Examination on the spot at intervals after the experiment convinced me also that no temporary benefits were secured. Another series of experiments, based onsounder principles, have been made, as follows:—An intimate mixture of fine clay powder containing 12 to 15 per cent. of carbolic acid is mixed with lime, also in fine powder, and the mixture thrown by coolies' hands on to the diseased leaves in the same manner as with sulphur and lime.

The object of using lime is here, however, different from that aimed at where sulphur is used. Carbolic acid is very slowly volatile, and with difficulty soluble in water, and where drops of the acid touch a leaf, &c., destruction of the tissues ensues. Carbolic acid has, moreover, a powerful odour, and it appears to be assumed in the experiments that this odour is a measure of so much vapour passing off from the mixture to be dissolved in the water on the leaf. I do not find, however, that the destruction of *Hemileia* spores in the neighbourhood of the mixture is commensurate with the alleged results. It is true that where water is in contact with the powder a solution is obtained sufficiently strong to kill germinal tubes, but the diffusion of this over the leaf is a very slow process. Under any circumstances the results of experiments with carbolic acid powder are not as yet encouraging, though I am of opinion that more might be done with some modification of it,* if it were not for the fact that *the accumulated powder and solution are a source of danger at the roots.*

I will pass on to the description of a few illustrative experiments before reporting further on the larger ones. A sturdy coffee plant, of which two leaves were diseased with "rust patches," was placed in a small Wardian case, the whole of the inside of which was painted with a saturated solution of carbolic acid in water. In the overpowering atmosphere produced the plant was tightly enclosed. After 24 hours I opened the case and removed the plant: the odour of carbolic acid was so strong, that one could with difficulty hold the head in the enclosure. Nevertheless, spores taken from one of the patches germinated normally in 24 hours. It is thus clear that in using carbolic acid (as with other reagents) the germinal tubes will have to be attacked with a solution of the acid.

Another experiment throws light on this subject. A thin layer of the mixture of carbolic acid powder and lime was sprinkled on the surface of the mould around two coffee plants, and at once watered. The watering was continued at intervals for three weeks, when one of the plants had but one yellow leaf left, and the leaves of the other were pale and drooping. The effects of even a dilute solution of carbolic acid at the roots are disastrous, though in the case of a large strong tree they may be to a certain extent masked by other changes.

But observations on whole estates prove the same, and I have failed to discover the good effects said to have been produced on estates by the treatment. That the germinal tubes are killed wherever a solution of carbolic acid comes in contact with them is true; but such a solution is not produced in the way described in the experiments on Pérádeniya, Gleneagles, Pallakelle, &c.

If carbolic acid powder could be used with safety, it would be more efficacious without the lime, which could be used with benefit as a manure; but in face of the fact that whatever external application were used, it would have to be repeated at least every three weeks or so, it would be highly injurious to permit such an increase of carbolic acid in the soil as would be the case here.

SEC. IV.—ON THE "ORIGIN OF LEAF DISEASE."

§ 21. The story of the discovery of the fungus *Hemileia vastatrix* by a well-known planter in Madulsima in 1869, need not be repeated in detail here; but since a general impression exists that the year of its discovery has connection with the date of its introduction into Ceylon, that because it was first seen in U'va it necessarily originated there, I would call attention to facts which throw the gravest doubts on such a view, if they do not invalidate it altogether.

I am told that when *Hemileia* was first seen on the coffee it was already common on the estate, and, indeed, on a neighbouring estate as well, and it is doubtful whether it had not already been observed in other parts of Ceylon. An examination of the weather reports in 1869 on the estate where the discovery took place shows the following.

March, 1869, was very dry, and April the same up to the 12th, when the wet set in for a fortnight or so. During May were showers at intervals, but cloudy, hot weather prevailed. Now, it was about June 1st, 1869, that *Hemileia* was first observed, and the spores which produced the spots then noticed no doubt germinated in April; for in the first place, *the spots were advanced and numerous,* and in the second, *the leaves were already falling.* In September, 1870, the disease was found in Nilambe and Hantane, and was there also in some quantity when discovered. Without, of course, making any positive assertion on what cannot be proved, it is very probable that *Hemileia* was already widely spread on the coffee in 1869-70, a conclusion rendered the more likely if we reflect how difficult it is to notice new discolourations on the leaves.

* As, for instance, using the weak powder alone on the leaves, and the caustic lime separately as a top-dressing to the soil.

COFFEE LEAF DISEASE.

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Apart from the extreme probability, however, that *Hemileia* slowly accumulated on *Coffea arabica* by passage from some jungle plant, I proceed to give strong objective evidence that such a view is most likely. I find, as indeed was already known, that *Hemileia* occurs on a native wild coffee (*Coffea travancorensis*), found in the jungles, and have experimented with the spores of the fungus on this plant with the following results. They form germinal tubes, block up the stomata, send branches into the leaf, and form the mycelium in *Coffea arabica*, as well as in *C. travancorensis;* and conversely, *C. travancorensis* can be infected by spores from *Hemileia* on *C. arabica*.

The anatomy of the fungus on *C. travancorensis*, moreover, offers nothing different in any important respect from that of the common *Hemileia;* the mycelium, it is true, is usually less highly developed and produces fewer spores and less virulent spots in consequence, but this depends on vigour and not on specific differences of any kind. It is at least probable, therefore, that *Hemileia vastatrix* lurked in the jungle long ere *Coffea arabica* was widely planted on estates in Ceylon.

About a year ago, however, my attention was directed towards another possible holdfast for "leaf disease" by finding a *Hemileia* which had already been collected by Dr. Thwaites in 1868, and named *Hemileia canthii* from the shrub on which it occurs (*Canthium campanulatum*). This *Hemileia*, on closer examination, did not appear to me to present sufficient differences to warrant its being constituted a separate species. In size, colour, shape and marking, the spores resemble those of *Hemileia vastatrix;* the structure of the spore-bearing head which protrudes through the *stoma* and the mode of origin of the spores are just as before. Unfortunately, I was unable to obtain a stock of fresh material at the time of these observations, and that in the herbarium at Pérádeniya was 12 years old, consequently no sowings could be made, and the evidence was incomplete.

During my journeys among the estates, however, I lost no opportunity of searching for *Canthium campanulatum* and its *Hemileia*, and found the shrub in Dumbara, Pussellâwa, Haputalé, Balangoda, Badulla, &c., at various times. It appears to be a widely-spread plant, therefore, but very few specimens as a rule occur together. During all this period I only met with the fungus in fruit once, though the yellowish spots and mycelium occurred oftener.

In January last I commenced experimental sowings with spores of *Hemileia vastatrix* from coffee on the leaves of *Canthium* plants placed in pots, &c. The result was what I suspected—the germinal tubes blocked up the stomata, sent their branches into the leaf, and commenced to form a normal mycelium in the inter-cellular passages of the leaf, as in coffee.

In August last, during a journey from Madulsima, I had the startling fortune to meet with a fair-sized shrub of *Canthium* badly diseased, and of which the leaves were in some cases covered with rust.* The plant was on the roadside a few miles out of Badulla, in the direction of Passara. Carefully collecting specimens, I proceeded to clear up what details I could on the fresh mycelium, &c. The mycelium and spore-bearing head are quite similar to that in coffee, the chief differences being due to the denser structure, &c., of the leaf in *Canthium*. The passages between the very small dense cells, with thick walls and closely-packed contents, and the small total mass of loose tissue in the leaf are among the chief peculiarities here. The stomata are also small.

The mycelium is therefore much less highly developed, and it is difficult to detect the thick stumpy branches among the crowded leaf cells. In proceeding to form the spore-bearing head, the branches meet in the chamber below the stoma and fuse into a cellular body, as in *Hemileia vastatrix*; but instead of many branches so meeting the sparse mycelium here sends but two, the fusion of which strongly resembles a definite process. The spores are produced in smaller numbers, but essentially as on coffee, and the sparse mycelium and spores recall what is seen in *Coffea travancorensis*.

The germination of the spore occurs readily, and resembles that of *H. vastatrix*. I have not succeeded in finding *telentospores* of *Hemileia canthii*.

Of course, on obtaining the above specimens, I at once instituted experiments to show whether the germinal tubes enter the coffee leaf. These experiments have not as yet been successful so far as to produce disease spots and fruit, since so many foreign spores were intermingled with all my specimens that their more rapidly-developed mycelium sadly interferes with germination. I hope, however, to conclude successfully before long.

It may be mentioned here that another possible source of the original spores on coffee may be some other host plant altogether; though it by no means follows as a necessity that the *conidia* produced by the *telentospores* of *Hemileia* ever germinates successfully in Ceylon. This, however, is hardly a matter for discussion here.

SEC. V.—SUMMARY AND CONCLUSION.

§ 22. I have now placed before you the details of what has been ascertained regarding *Hemileia* and its relation to coffee leaf disease, and may sum up the main points of importance as follows:—

* It is worth remarking that a *pyrenomycetous* fungus occurring as a black crust on many of the leaves is very similar to one common on coffee, and interferes sadly with experimental sowings.

1.—*Hemileia vastratrix* is a parasitic fungus, the spores of which are capable of rapid germination on the moist surface of a coffee leaf. The short tubes thus produced enter the breathing spores of the leaf, and in less than a week, in favourable circumstances, begin to form a mycelium which at the end of another week or so have done sufficient damage to the leaf to produce yellow spots. During the third week the spores are usually produced, each to act as before, if sown, &c.

2.—A leaf of the coffee attacked at numerous points by such germinating spores rapidly succumbs to the ravages of the mycelium, and falls long before it would normally have done so; not only by directly robbing the tree of food prepared by the labours of the leaf, but, further, by occupying space and shortening the period of usefulness of the leaf, is the tree injured.

3.—The loss of matter and functional disturbance brought about by these continued and periodical ravages have for effect a diminished power to mature crop on the part of the coffee; and flower-buds, flowers, and berries fall because the nutritive relations between the shoots, leaves, and flowers have become overthrown. More crop is born, as a rule however, where the trees contain more food material to support it.

4.—The spores of *Hemileia* are carried by wind. Whether a spore travels a long distance in one journey, or whether it is swept along in successive leaps, it may be carried from one estate or district to another. The shaking of the trees also disseminates spores, and they are driven from fallen leaves to the trees. These spores, scattered on the foliage, become washed down to the lower surface and germinate as before, provided the atmosphere, &c., be sufficiently moist.

5.—No special predisposition on the part of the coffee is required for its infection, and no other conditions are necessary to the spore than moisture and the presence of air, &c., as with any germinating seed.

6.—The spores are in such countless numbers, germinate so rapidly, and some of them so easily escape the action of even the most efficacious remedies, that no good and lasting results can be obtained from external applications unless the sources of reinfection be removed. No attempts to combat the disease by passing ingredients into the tree have shown any trace of success: the mycelium cannot be attacked after it has entered the leaf.

7.—Diseased leaves should be collected and destroyed, and every means possible employed to prevent the ingress of winds. Cultivation should be directed to these ends, and the pruning and manuring, as far as possible, arranged so that large masses of young foliage are as seldom as possible exposed as a surface of food material for the spores at those times when they are most blown about, as at the bursts of the monsoons. In cases where the disease is threatening to denude the trees of leaves at the critical period when crop is ripening up, there can be little question of the use of lime, unless weightier considerations, based on the results of experience with that particular soil, forbid it.

8.—Manure can in no sense be properly looked upon as a cure for the disease. In so far as it enables a tree to clothe itself with dense foliage, the tree may be able to afford the sacrifice of a number of its leaves to the fungus; but the well-fed mycelium will in such cases produce more spores in proportion, and these may be the more readily distributed, and germinate on other leaves, and so the stock of fungus be actually increased. Nevertheless, careful manuring is necessary for the production of crop without damage to the tree.

9.—The burning of fallen leaves, &c., is almost universally condemned by planters as too dangerous. In cases where this cannot be done, it is better to bury the leaves and prunings than to leave them tossing about. In doing this, the layers of leaves and prunings (which may be mixed with weeds) should be carefully covered with caustic lime and earth and not disturbed for several months. The suggestion that the leaves might be placed under pigs and cattle affords a less safe alternative; but even this plan is much better than leaving them to be blown about the estates. The sooner the leaves are gathered after falling, the more spores are destroyed with them.

10.—The origin of leaf-disease cannot be traced with certainty; but the evidence is so strong in favour of its having arisen from an invasion of spores out of the jungle, that this view may be considered highly probable. Once on the coffee, its spread would be very rapid, where such large unbroken areas extend. No trace of valid evidence exists for the views that the disease has been "induced by artificial manuring," or "caused by alterations in the sap of the tree;" it is, beyond all doubt, the results of the action of a fungus derived from without, the spores of which were either imported into Ceylon (an improbable event) or came from the native jungles.

In conclusion, I beg to call your attention to certain important details in the following appendix.

I remain, &c.,

H. MARSHALL WARD, B.A., Camb.,
Cryptogamist.

Péradeniya, September, 1881.

APPENDIX.

A.

COFFEE LEAF DISEASE.

THIRD REPORT.

Appendix.

The following table summarises shortly a number of experiments, selected from a large series, made to determine (1) the time occupied in the germination of a spore, (2) how soon afterwards the "disease-spot" appears on the leaf, (3) how long the mycelium may continue to produce spores. In each case a vigorous young plant was selected which had been grown for some months in a sheltered situation, and was clean and healthy. On a recently-formed leaf a sowing of spores was made, kept moist for 24 to 48 hours, and then (the damp cell having been removed) placed in a carefully cleaned Wardian case, well lighted, sheltered, and kept at an average temperature of about 78° Fahr. In all cases the spores were found to germinate in 24 hours, and the tubes had commenced to block up the stomata within 48 hours. For all examples, also, the following holds good: the "disease-spots" appeared on the leaf on which the sowing was made, and within the area of sowing, *and nowhere else on the plant.* Moreover, no more "disease" appeared on the same plant, even after keeping it for several (six to eight) months, unless a fresh sowing was made and kept moist for 24 to 48 hours as before.

These facts prove (1) that the "disease-spots" and "rust" result from the tubes and mycelium traced by the microscope from the spore, (2) that the fungus corresponds in area with the disease spot, (3) that even if spores be present on the leaf, no "disease" results unless the conditions (moisture, &c.) for germination be also present. Finally, taken in conjunction with the results of microscopic analysis, they prove that the disease-spot is due to the action of an organism derived from without, which passes through definite changes, and has a limited term of life.

Variety of Coffee.	Date on which spores were sown.	Date on which spot appeared.	Date on which spores were first seen.	Approximate date of greatest vigour.	Approximate date on which spot turned black in centre.	Approximate date on which spores ceased to form.	Time occupied in forming "disease-spot."	Time during which spores were continuously produced.
A.—Jamiaca ...	Jan. 27	Feb. 4	Feb. 6	Feb. 12	—	—	8 days	—
B.— do. ...	Jan. 30	Feb. 13	Feb. 15	Mar. 1	April 25	May 1	14 days	10 weeks
C.—Nakunaad ...	Jan. 11	Jan. 25	Jan. 28	Feb. 6	Mar. 14	April 1	14 days	8 weeks
D.— do. ...	Jan. 23	Feb. 4	Feb. 6	Feb. 13	Mar. 10	Mar. 31	12 days	7 weeks
E.— do. ...	Jan. 22	Feb. 3	Feb. 6	Feb. 14	Mar. 12	April 1	12 days	7 weeks
F.—Java ...	Jan. 18	Feb. 6	Feb. 9	Feb. 20	April 2	May 1	19 days	11 weeks
G.— do. ...	Jan. 22	Feb. 4	Feb. 6	Mar. 1	Mar. 30	April 20	13 days	10 weeks
H.—Indian ...	Jan. 11	Jan. 26	Jan. 30	—	—	—	15 days	—
I.—Ceylon ...	July 24	Aug. 7	Aug. 10	Aug. 20	—	—	14 days	—
K.—Java ...	Aug. 1	Aug. 17	Aug. 20	—	—	—	16 days	—
L.—Ceylon ...	Jan. 21	Feb. 3	Feb. 5	—	—	—	13 days	—
M.— do. ...	Jan. 20	Feb. 3	Feb. 6	—	Mar. 20	—	14 days	—

N.B.—In addition to the above, several other experiments of the same nature made during the year gave similar results; in all cases the spots appeared on the 12th to the 15th day, and the spores on the 15th to 20th day after germination. The average of the 8th column (164/12) gives nearly 14 days (13·7) as the period between the date of sowing and that of the first appearance of the "pin-spot."

B.

The following table summarises in a similar way the results of observations made to determine (1) how long a time is occupied by the coffee plant in forming a complete pair of leaves, (2) at what period they become attacked by the fungus, and (3) how long they survive the ravages of the pest. In all the specimens selected there were several of the disease spots on each leaf; but of course no absolute standard of the damage done is given, and it must be remembered that a young leaf badly spotted falls sooner than one affected in a less virulent degree.

The following example will illustrate the mode of reading the columns. Taking the specimen F, the minute terminal bud evident so early as September 6th, 1880, remained quiescent during forty days—till October 16th—and then commenced to swell and unfold its pair of leaves. In about a month's time (November 15th) the leaves were completely formed and in full activity, and apparently clean and healthy. November 18th was the last date on which no trace of disease was visible to the naked eye; but it is evident, from what is known of the periods in the life history of *Hemileia*, that the germinal tubes had already entered the stomata and formed mycelia, for on November 23rd the yellow spots ("pin-spots") were apparent, and had developed spores before December 5th. The formation of spores continued, and the leaf was badly diseased with "rust patches" before December 22nd, when the spots were already old and turned brown. On January 1st, 1881, the leaf had fallen, and an examination of the last two columns shows that out of 2½ months' term of life the leaf was obviously pestered with the fungus half the time. Moreover, we must recollect that nearly a month (October 16th to November 15th) was occupied in bringing this leaf into full activity, and probably a fortnight must be added to the last column, during which time the mycelium was forming. How little of the total life and powers of such a leaf benefited the tree will be evident on comparing these results.

The method adopted in arriving at these conclusions was to mark a given vigorous twig, and note the progress of the bud, fungus, &c., at intervals of a few days. No other conclusions than those for which the tables are designed are intended to be drawn: *e. g.*, in the example given, the date December 5th (in the 6th column) does not mean that *the first spore formed on that day;* but that, taking notes of the progress of events on December 5th, I found *spores were already formed by the spots in some quantity*, whereas they were not present when notes were taken some days earlier.

To take another example (K), we find a very different series of events when no mycelium or only an odd spot appears; here the bud of January 30th began to unfold in February, and reached its full development as a pair of leaves about March 10th. Up to June 26th no signs of disease had appeared, and we notice that the traces of spots noted on July 6th never came to anything, as signified by "0" in the column: the leaf fell on August 10th, after a total life of 21 weeks or so. In such a case we may safely assume that its work was chiefly devoted to the benefit of the tree.

Date on which the bud was first noticed.	Date on which unfolding of leaves had begun.	Date on which leaves may be considered adult.	Last date on which Leaves appeared quite clean.	Date on which the "pin-spots" were first noticed	Date on which the spores were first noticed.	Date on which the leaf was badly "rusted."	Date on which the spots were brown.	Date on which the leaf fell.	Total life of unfolded leaf (approximate).	Time during which the "disease" was visible (approximate).
									Weeks	Weeks.
A Aug. 27	Aug. 30	Sep. 30	Oct. 16	Oct. 20	Oct 29	Nov. 18	Dec. 1	Dec. 22	11	8
B „ 29	„ 30	„ 30	„ 29	Nov. 1	Nov. 8	Dec. 5	Dec. 5	„ 20	11	7
C Sep 14	Sep. 17	„ 30	Sep. 30	—	„ 7	Nov. 28	—	„ 5	9	5
D „ 30	Oct. 20	Nov. 15	Nov. 15	Nov. 16	„ 18	„ 30	Dec. 22	„ 30	6	6
E Aug. 20	Aug 26	Oct. 16	Oct 29	„ 1	„ 8	Dec 5	„ 22	Jan. 1	10	8
F Sep. 6	Oct 16	Nov. 15	Nov. 18	„ 23	Dec. 5	„ 22	„ 22	„ 1	6	5
G* Oct. 29	Feb. 1	Feb. 27	Mar. 14	Mar. 29	0	0	0	June 29	16	0
H Oct. 30	„ 1	„ 27	April 25	May 8	May 25	June 29	July 15	Aug. 3	21	10
I* Jan. 30	„ 10	Mar. 14	May 8	0	0	0	0	July 6	16	0
K* „ 30	„ 5	„ 10	June 26	July 6	0	0	0	Aug. 10	21	0

N.B.—In the examples marked (*) the leaf never became badly diseased, but at most one or two "pin-spots" appeared and produced no spores at all, and it is doubtful if the mycelium of the fungus was ever present to any large extent. In all the other cases about 10 to 15 "disease-spots" appeared on each leaf, and produced spores as described.

C.

AN instructive series of observations were made to obtain an answer to the question, How long will the leaf remain on the tree when not attacked by *Hemileia*, or when only one or two small and barren disease spots appear? The methods adopted were the same as before.

To take an example (C,) we find that, on December 20th, the leaf was adult, and in full working order. It retained its green, bright colour until April 2nd, when a few faint yellowish cloudy patches were observable. (These are signs of approaching dissolution.)

On April 25th the leaf had become yellow, like an autumnal leaf in Europe, and fell soon after, about May 3rd, having done its work for the tree, but having escaped the ravages of the mycelium of *Hemileia*.

Date on which leaf may be considered fully formed.	Date about which leaf began to turn yellow.	Date on which leaf was quite yellow.	Date on or about which the leaf fell.	*Hemileia* spots, absent or present.	Length of time the leaf remained (approximate).
A —June 26 ...	Sep 30	Oct. 10	Oct. 16	None	16 weeks.
B.—Nov. 22 ...	Feb. 15	Feb. 24	Mar. 1	One minute spot on February 22	16 „
C.—Dec. 20 ...	April 2	April 25	May 3	None	20 „
D.—July 18 ...	Nov. 8	Nov. 15	Nov. 18	None	17 „
E.—July 16 ...	„ 15	„ 20	„ 21	4 small dull spots in November	18 „
F.—Jan. 2 ...	April 25	May 1	May 8	None	18 „

N.B.—These examples should be compared with examples G, I, and K, in the last table. It is to be noted that none of the small spots taken into account here were either very vigorous or present for a long time before the leaf fell. It is also worth remark that 20—21 weeks is the longest period I have yet found a coffee leaf to persist on the trees in the open.

D.

To determine as far as possible the rate of growth and other changes in leaf buds and leaves at Pérádeniya, certain trees were selected in August, 1880, and watched during the following twelve months, notes being made at short intervals as to the conditions of the buds and leaves on twigs around which coloured ribbons had been loosely tied.

The shortest time in which a pair of leaves was developed in my experiments was about four weeks, when the bud first exposed, on April 10th, became an adult pair of leaves by May 8th; and

the longest period occupied by the same process was, excluding a very abnormal example where 17½ weeks were occupied in the process, 13 weeks, where a bud which first appeared free on October 29 did not begin to open until the following January, and its leaves were not fully formed before February 27th.

During the very dry weather experienced in Pérádeniya from December to March, there is on the whole much less activity displayed in the formation of leaf-buds and leaves than during the period from April to August, and this is in accordance with the general experience of planters on the Kandy side of Nuwara Eliya. Of course there are differences in the rate of development of leaves, dependent on circumstances other than the weather, since the time at which pruning, manuring, &c., are done affect these and other phenomena; moreover, since the buds are slower in development where winds or a general low temperature prevails than where the air is quiet and warm, it will be evident that elevation affects this as other processes of growth. The trees on which my observations were made suffer much from leaf disease, and bear little crop, circumstances which must also be taken into account.

Branch A. (Tree not Pruned.)

Date on which bud became visible.	Date about which bud began to open.	Date when the Leaves separated.	Date on which the leaves were full sized, &c.	Time occupied in opening, &c., (approximate).	Whole period of development (approximate).
August 2	August 26	September 6	October 16	7 weeks	10½ weeks
September 6	October 16	October 29	November 15	4 ,,	12 ,,
October 29	January 10	February 1	February 27	7 ,,	13 ,,
—	February 1	February 20	March 29	8 ,,	—
March 7	March 29	April 5	April 25	4 ,,	7 ,,
April 25	May 20	May 25	June 15	3½ ,,	7 ,,
May 25	June 15	June 26	July 14	4 ,,	7 ,,
June 26	July 6	July 18	August 1	3½ ,,	5 ,,

On this branch, therefore, eight pairs of leaves were completely formed during the 12 months (August 1, 1880, to August 1, 1881), the period of slowest growth being September to February; that of quickest growth, April to August. The pair of leaves which developed most rapidly was formed in June—July; that which developed most slowly, in January—February.

Branch B. (Not Pruned.)

Date on which bud became visible.	Date about which bud began to open.	Date when leaves had separated.	Date on which leaves had attained full size, &c.	Time occupied in opening (approximate).	Whole period of development (approximate.)
August 5	October 10	October 16	November 8	4 weeks	12 weeks
November 1	January 20	—	February 25	4½ ,,	17½ ,,
—	February 21	March 7	April 25	9 ,,	—
March 7	March —	March 30	April 30	—	7½ ,,
March 30	April 14	April 20	May 2	2½ ,,	4½ ,,
April 20	April 25	May 1	May 30	4½ ,,	5 ,,
April 30	July 6	July 20	August 8	5 ,,	6 ,,

Branch C. (Pruned Tree.)

Date on which bud became visible.	Date about which bud began to open.	Date when leaves had separated.	Date on which leaves had attained full size.	Time occupied in opening (approximate).	Whole period of development (approximate).
January 22	January 30	February 10	February 27	4 weeks	5 weeks
January 31	February 10	February 24	March 14	4½ ,,	6 ,,
February 24	April 2	April 15	May 1	4 ,,	5 ,,
April 10	—	—	May 8	—	4 ,,
May 1	May 8	May 20	June 20	6 ,,	7 ,,
May 25	June 15	June 20	July 15	4 ,,	7 ,,

E.

THE fact that the spores of *Hemileia* are conveyed from place to place by wind has been abundantly proved. I select the following as illustrations of experiments equally successful in Badulla, Dimbula, and other districts besides those named:—

Clean slips of glass measuring 3 in by 1 in., and therefore approximating the area of a coffee leaf of small size, were smeared evenly on one side with a thin layer of pure glycerine, and exposed in various positions for various lengths of time, in such a manner that spores borne by the wind to the viscid surface would be retained, and afterwards detected by microscopic examination.

The examples chosen for the following table illustrate more or less the following conclusions: that (1) the spores are borne by wind in all parts of the country; (2) the more "rust" present, the larger the number of spores in the air.

To illustrate further, No. 5 may be selected as remarkable. In Pérádeniya, on July 8, 1881, the trees were much diseased and "rust-patches" showing up badly all over, the wind was very high, and blowing from the S.W. in heavy gusts. One of the slips of glass was placed vertically on end in a cleft bamboo and arranged so that the viscid surface faced the nearest coffee at a distance of 18 feet. The length of the bamboo was a little over 5 feet. After 12 hours' exposure the slip was examined, *and 117 spores of Hemileia found imbedded in the glycerine*, together with small insects, insects' eggs, spores of various fungi, algæ, and lichens, and pieces of sand, &c., blown in the same manner on to the trap set.

Another proof of the same fact is afforded by my finding numerous spores of *Hemileia* entrapped in the meshes of some canvas exposed amongst the coffee for several months: there were spores in all stages of germination, as well as fresh and recently-blown specimens.

District.	Month	State of the Disease.	Wind.	Distance of glass slip from coffee.	Distance of glass slip from ground.	Method of exposure of the slip.	Length of exposure.	No. of *H. V.* spores found.
Rakwána ...	April	Very little "rust" visible.	Scarcely perceptible.	4 feet	3 feet	Flat on a rock	14 hours	1
Dikoya ...	May 13	do.	do.	6 ,,	2 do. below coffee.	Flat on rock in middle of a stream.	8 ,,	1
Pundalu-oya ...	,, 22	do.	Slight	12 ,,	5 feet	Flat on a charred log	12 ,,	2
Pérádeniya ...	June 3	A few spots of "rust" here and there.	High	12 ,,	On the grass.	Flat	8 ,,	7
Do. ...	July 8	"Rust" patches becoming very bad.	Very high	18 ,,	5 feet	Vertical: the smeared side towards the coffee.	12 ,,	117
Do. ...	do.	do.	do.	25 ,,	4 do.	do.	12 ,,	21
Do. ...	July 9	do.	do.	20 ,,	4 do.	do.	2 ,,	8
Do. ...	do.	do.	do.	12 ,,	5 do.	do.	2 ,,	13

F.

THE following may serve to convey some idea of the enormous masses of fallen leaves which are often left to blow about estates:—

(1) On a patch of 100 coffee trees, in the neighbourhood of the Ramboda district, swept clean on January 1st, 1881, the quantity of leaves which fell from the trees during January and February was as follows. They weighed 18 lb. (very dry). Since 2,092 went to the pound, the experimenter estimated nearly 38,000 leaves in all. On the same patch from March 1st to April 31st the weight was 19 lb., 1,290 leaves to the pound. The March and April showers cause flushes of new leaves which are larger and heavier; at the same time fewer leaves fall in those months.

(2) In Madulsima, on a swept patch of 100 trees as above, there fell from 20th December, 1880, to 20th January, 1881, 22 bushels of air-dried leaves fairly heaped.

(3) In Pundalu-oya the following observations were carefully carried out. All the leaves and prunings which had fallen during the past ten or twelve months on an oblong field of 6 acres were collected and heaped, and the cubic contents measured. It was estimated that more than 1,200 cubic feet of leaves and prunings had been collected

On a swept, square area, measuring about one-tenth of an acre (160 trees) and enclosed with cadjans, the leaves were allowed to fall for two months (February and March), and 20 bushels of leaves were collected; during April and May there fell 11 bushels on the same area.

G.

I HAVE obtained, among others, the following estimates as to the cost of sweeping up fallen leaves, &c., in answer to inquiries, and as the result of experiments actually tried. Each of the following paragraphs is quoted from the letter of an independent observer:—

1. *Kotmalé.*—"I have done 80 acres, which gives me a fair idea of what the cost should be, as in some cases the branches, &c., had to be carried as much as 200 yards.....Thoroughly sweeping the ground and carrying branches and leaves to ravines or other suitable places for burning, has I find, cost me 10 coolies per acre, which would be equal to Rs 3·50 per acre."

2. *Uda Pussellâwa.*—"The cost [of sweeping up leaves and burying them] is rather heavier than I anticipated, as each man on an average did but 100 to 200 trees a day, the field being widely planted; this would take 7 men to the acre = Rs. 2 52 per acre. But I only employed lads to do it, rated at 25 or 29 cents each. They certainly can do the sweeping more nimbly than men, but for the holing, lining, and filling up, bigger men would have done quicker work; and in this case I am certain Rs. 2 per acre would be ample. Then, again, if this field had not been in contract, I would have made the sweeping work act for a weeding, and so saved Rs. 1·50 per acre for this month."

3. *Madulsima.*—"The cost of removing the leaves, prunings, &c., was, as nearly as I can make out, Rs. 6 per acre. You will have noticed that they were removed only to a short distance—on to the grass fields adjacent."

4. *Mátalé.*—"My official estimate for weeding and sweeping combined for 12 months = about Rs. 1·25 per acre. I have done it 12 times a year for 8 years.....It cost me more at first by from 50 to 75 cents an acre by contract. I do it now by estate labour.....People who do not manure so much as we do might weed and sweep more cheaply."

COFFEE LEAF DISEASE.

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Appendix.

THE following illustrations give some idea of the proportion between the numbers of successful and unsuccessful flowers in the clusters up to May, this year.* They were obtained by counting the flowers and young berries in the various clusters, and are all taken from "spikes" which appeared capable of producing much more than they actually bore: I estimate about 200 flowers to each "spike" during the season.

The tables are not intended to prove *by how much* a tree is benefited by manure, but to illustrate (1) that a very large per-centage of flowers become fertilized but do not ripen as crop, and (2) that more fertilized flowers on the whole arrive at the stage of green crop when the tree has been manured. It must be remembered further that the 5th column does not refer to *ripe crop:* the trees had to pass through a second attack of leaf disease ere that stage, and it need only be said that a much larger proportion ripens on manured than on neglected trees, other things being equal. This proportion I have computed.

In reading the results, the example No. 4, Table II., may be instanced:—A flowering shoot on a fine tree possessed nine double clusters of flowers; of the 200 or so of flowers which are typically produced, we find that 131 were apparently fertilized, and commenced to swell as berries. Of these, however, 39 never came to anything beyond the size of a large pinhead; the remaining 92, however, had swollen and (in April—May) become green crop about the size of a large pea. The question, how many of these 92 will ripen up as mature crop, depends on the condition of the tree as regards leaves, and therefore on the degree of damage done to it by the forthcoming attacks of *Hemileia*. From comparisons with other trees of the same age and condition, I have estimated that 60 of the cherries may ripen. This is certainly not *below* the number.

Both the tables were compiled in April—May, and represent what occurred largely at that time in 1881:† leaf disease appeared in June, and became bad in July and August, denuding most shoots of the majority of their leaves. This causes a further reduction by the dropping of the half ripe crop, or by its turning yellow and shrivelling up to "light" brown and black masses. As far as I can ascertain, this will reduce the number given by from 75 to 25 per cent. according to the state of the coffee, &c.

I.—*Not Manured.*

General type of tree selected.	Number of clusters (double) on spike.	Number of flowers fertilized.	Number of berries which fell early.	Number of berries swollen.	Per cent. of successful flowers in May.	Probable number of ripe berries picked (calculated).	Probable per cent. of all failures (supposing 200 flowers per spike).
Very thin ...	10	46	38	8	17 per cent.	4	98 per cent.
Very thin ...	8	—	—	2	—	—	99 ,,
Poor and thin ...	9	—	—	10	—	5	97 ,,
Fair ...	9	89	42	47	52 per cent.	24	88 ,,
Rather thin ...	10	92	50	42	45 ,,	20	90 ,,
Thin ...	9	82	71	11	13 ,,	8	96 ,,
Very poor ...	10	46	43	3	7 ,,	2	99 ,,

N B.—The numbers in the 7th column are least reliable, having being calculated before all crop is ripe; nevertheless, they are not too low for these and many other unmanured trees of 15 to 20 years in ordinary soil. At the same time, it will be noted that even four cherries per shoot would mean 1,000 per tree, if regular on trees with 250 shoots This over the whole acreage would mean 10 cwt. per acre if the regularity were kept up. What must be the irregularity where 2 cwt. or so result! As already pointed out, however, these tables are only for illustration; no exact calculations can be based on the numbers without many more data

II.—*Manured Coffee.*

General type of tree.	No. of clusters double) on spike.	No. of flowers fertilized.	No of berries which fell early.	No. of berries swollen.	Per cent. of successful flowers in May.	Probable No. of ripe berries picked (calculated).	Probable per cent of all failures (supposing 200 flowers per spike)
Very large and fine: no crop last year...	12	264	162	102	39 per cent.	70	74 per cent ‡
Luxuriant ...	11	171	87	84	49 ,,	60	70 ,,
Rather thin ..	10	102	56	46	45 ,,	30	85 ,,
Fine tree ..	9	131	39	92	70 ,,	60	70 ,,
Thin ..	8	87	35	52	59 ,,	30	85 ,,
Fine tree ...	11	133	32	101	76 ,,	70	75 ,,
Thin and poor ...	12	127	101	26	20 ,,	20	90 ,,
Luxuriant ...	14	184	119	65	35 ,,	50	75 ,,
Fine tree ..	10	118	82	36	30 ,,	20	90 ,,

* The crop begins to ripen about August; picking concludes about December.

† The seventh and last columns were compiled in September, after examining many trees.

‡ Since 264 flowers were here actually fertilized, the per-centage must be based on that number instead of 200 as with others. Here again, if the trees were regular, these numbers would represent *enormous* crops, but they are not; hence the impossibility of estimating crops as is said to have been done formerly. However, the numbers fairly illustrate how the decrease occurs, as also that more cherries per cent. ripen on manured coffee than on trees which have not been manured.

A few further illustrations of the damage done are afforded by the following figures. A gentleman in the Kandy District counted the flowers which had set on two branches, and found as follows on March 29, 1881:—

Branch.		No. of double clusters.		No. of flowers fertilized.		Approximate per-centage (if 200 flowers per spike).
A.	...	11	...	108	...	54
B.	...	11	...	106	..	53

On counting the same clusters on June 14 following, the following were the numbers :—A. had dropped all but 38, and B. all but 52 of the berries, which promised to mature. This was of course before the July attack of leaf disease, and a large reduction always occurs then from leafless branches being unable to mature the nearly ripe cherries.

On September 13th the branches were again examined, and the following report made :—" One of the branches has lost all its leaves, and is blackening at the tip. In a week or so more I expect to see the 'dying back' reach the crop, which in its turn will also die and drop off. The other branch is not so bad as the one mentioned, though it is fast following suit."

I quote the following from a letter which I have received from one of the oldest and most experienced men in Ceylon, in answer to my enquiries :—

" I used to consider 10 to 12 berries from one eye good—say 20 to 24 in the double cluster, but I have seen a great many more. 12 berries—or 6 berries on each side of the branch—would now be very good. It is thus we lose our crop now : a pretty regular blossom comes out, and every one says, 'Now we shall get a crop ;' but instead of having 6 to 12 berries in an eye* we have one, two and three..... I used to calculate that one measure of ripe cherries from a tree would give fully 5 cwt. per acre, after allowing for ordinary vacancies "

I.

EXPERIMENTS have been made to answer several questions put from time to time by planters and other gentlemen on the following points :—

1. *Can the germinal tubes enter the leaf from above?*

No attempts to infect a leaf from above have succeeded, and I never find the mycelium originating from tubes at the upper surface ; that this is because the dense epidermis of the upper surface protects the leaf, as is proved by the following experiments. Spores sown on a patch of the upper surface whence the epidermis was carefully removed with a sharp razor not only germinated, but commenced to enter the leaf at once. Again, spores sown on the viscid surface of the stigma of the flower readily germinate, and the tubes commence to enter the tissues which are unprotected by epidermis. These tubes soon die, however, and never arrive far down the style.

2. *How do the spores reach the under surface of the leaf?*

If a coffee tree be watched when blown by a steady high wind, a large portion of the leaves are seen to be turned half round on the axis of the leaf stalk, and in such a manner that the lower side of the leaf is beaten obliquely by the wind ; if such a leaf be compared with the glass slip in my experiments of July 8th and 9th, it will be evident that many spores may strike it, some of which will stick to the epidermis, which is probably never quite dry. If one watches a tree in still, rainy weather, when the fine rain falls straight down on to the quiet leaves, the rain-water is seen to be shed from the glossy upper surface of the leaf in small streams ; still more careful examination demonstrates that some of the water flows to the tip of the leaf down the inclined mid-rib, while the rest flows to the edges along the depressed channels formed by the sinuous curving of the lateral parts. These small streamlets carry spores (which had been blown on to the upper surface) to the edges of the leaf ; on arriving there, many of them stick just under the edge by capillary attraction while the water drips away. This may be proved by supporting perfectly clean slips of glass in fine rainy weather in the position of a coffee leaf, and shaking a few spores on its upper surface. It also explains why so many of the disease spots appear first at the tips and edges of the leaves.

Various combinations of these circumstances of wind and rain account largely for the distribution of spores on the lower surface of the leaf ; but there are other ways in which the spores obtained a proper area for mischief. In Wardian cases, where the plant is kept damp, and the lower surfaces of the leaves become wet, I find the spores formed on a given spot simply wander by physical means on the film of water spread over the same leaf, and germinate on another part of the same surface. So, too, one may often observe that a vigorous " rust spot" has distributed many of its spores immediately around itself, as well as on other leaves and plants rubbing against it.

3. *Does Hemileia occur in the seed, or stem, or root, &c.?*

No: I find no trace of the mycelium in any other part of the plant than the leaf, and the comparison of seeds and plants of West Indian as well as Javan and Indian coffees has convinced me that no traces of *Hemileia* mycelium do occur elsewhere. The yellow streaks and marks on what is called " diseased" or " bad" wood are evidences of poor nutrition, but there is no mycelium in the tissues.

* *I. e.*, in the single cluster on *one side* of the twig : 2 eyes = the " double cluster" referred to before.

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4. ***Is a tree already diseased more or less liable to infection than a healthy tree; and are selected trees able to resist the disease?***

I find that the germinal tubes enter the green parts of a leaf already spotted with disease as they do any other leaf; such leaves are neither more nor less liable to infection. Not only do I find no support to the view that certain trees resist disease; but, after trying infection experiments with all kinds of coffee, it seems that Ceylon varieties are no more liable to disease in this sense than Indian or Javan and Jamaican.

5. ***Why do the lower leaves on the branch usually become worse diseased at first?***

The lower leaves are the older, and have been longer exposed to serve as a resting place for any chance spore, blown through the air or shaken from a higher part. In many cases, also, and especially in nurseries, &c., they are nearer the ground, more shaded, and hence moist for longer periods than upper ones. The fact of their being older in many cases explains also why they fall before the others; having already done much work, they cannot long support the fungus mycelium, if the latter is in any large quantity.

XVIII.—1881.

RAILWAY EXTENSION TOWARDS UVA.

FURTHER CORRESPONDENCE

RELATIVE TO THE

HAPUTALE SECTION.

(In continuation of Sessional Paper No. XVI. of 1880.*)*

Ordered by His Excellency the Governor to be Printed.

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1881.

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FURTHER PAPERS

ON THE SUBJECT OF

RAILWAY EXTENSION TO ÚVA.

No. 1.

Governor Sir J. R. LONGDEN, K.C.M.G., to the Right Hon the EARL OF KIMBERLEY.

RAILWAY EXTENSION TO UVA.

FURTHER PAPERS.

No. 288.—*Miscellaneous.* Kandy, 31st December, 1880.

MY LORD,—I HAVE the honour to enclose herewith a memorial which was placed in my hands for transmission to your Lordship by an influential deputation of Unofficial Members of the Legislative Council, Merchants, Planters, and others, praying that your Lordship will sanction, at an early date, the projected extension of the railway now under construction, from Nánu-oya to Haputalé; or that, if such sanction be not granted, a private company may be authorized to undertake the work.

2. The memorial itself is numerously signed, not only by Europeans, but also by Siphalese and Tamil traders and landowners, copies having been circulated in both those languages. Among the names are those of the following Unofficial Members or ex-Members of the Council: Messrs. Downall, H. Bois, F. M. Mackwood, G. A. Talbot, G. B. Leechman, and H. C. Buchanan. The great number of merchants, bankers, and mercantile firms, who, in addition to the planters of Haputalé and Badulla, have signed the memorial, testify to the deep interest taken in the question. In my Despatch No. 306 dated 9th September, 1878, I forwarded a copy of a Memorial from the native merchants and traders of Uva, submitting their prayer for this railway extension, founded upon the losses they sustained by reason of the difficulties and delays of the cart traffic. The native signatures to the enclosed Memorial may be accepted as showing their continued interest in the question.

Enclosed.

Enclosed.

3. The correspondence that has already taken place upon this question appears to make it unnecessary that I should in this Despatch occupy your Lordship's attention at any length upon it. The advantages to be derived from connecting the Uva country, including the districts of Haputalé, Lémastota, and Badulla, with Colombo by rail have been fully set forth in the petitions and memorials from the people of Uva, the Planters' Association, and the Chamber of Commerce, which have from time to time been laid before your Lordship and your predecessors. I would only notice here that the Haputalé district is one of the best coffee-producing districts in the Island, and that there does not appear to be any ground for doubting its continued productiveness.

4. In my Despatch No. 306 of 9th September, 1878, I submitted copies of the report made by the Railway Commissioners as to the traffic that would be served by the projected railway, and the rates at which that traffic must be assessed in order to pay for the construction of the line. The estimates of the Engineers have since been approved by the Consulting Engineer, and both the estimates of cost and the estimates of traffic may be accepted as fairly reliable. It is worth while noticing that the extension to Haputalé will bring on to the main line the whole of the Uva traffic which is now carried painfully by cart by way of Ratnapura. This will be a considerable addition to the railway revenue of the main line independently of the revenue raised from the extension, and as the seasons on the east or Uva side of the mountains differ from the seasons on the Dimbula or western side of the main chain, the additional traffic will fall in what is now the slack season of the Kandy railway, and can be carried without difficulty.

5. The section of the 42 miles of rail now under construction between Náwalapitiya and Nánu-oya is an integral part of the proposed railway to Haputalé, and it would be obviously useless to complete the 25 miles from Nánu-oya to Haputalé before the line to Nánu-oya is complete. Moreover, all the arguments that have been used by the advocates of the railway to prove the advantages of railway carriage over cart traffic apply with full force to the carriage of such heavy materials as the permanent way of a railway to a height of between five and six thousand feet, and I believe that it will be found economically advantageous to make use of the completed railway to Nánu-oya to convey to that station, where the Haputalé extension commences, the rails for that extension. There is no reason however to delay the earthwork, masonry and tunnels, which may, if the

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construction of the line be sanctioned, be proceeded with—not indeed at present, but while the Nánu-oya section is still under construction.

6. I have called upon Mr. Mosse, the Resident Engineer of the Railway Extensions, to furnish a report on the work commenced by the contractors on the Nánu-oya line, the rate of progress, and the probable time of the completion of the work, together with an estimate of the probable time that would be required for the extension to Haputalé; and I shall forward this report, if possible, by the ensuing mail.

7. I would, in connection with the subject, draw attention to the 14th, 15th, and 16th paragraphs of the enclosed memorial. The memorialists do not overstate their case in pointing out the present and future advantages that would be derived from the railway. The existing traffic is calculated to pay 4·13 per cent. on the cost of construction in the rates levied between Haputalé and Nánu-oya alone, without reckoning the rest of the line;* and there is a large tract of forest land in the Ohiya valley, which the railway will traverse, that the Government have hitherto reserved, but which will be opened for sale and cultivation when the railway is made, and will add considerably to that traffic.

8. Your Lordship's predecessor a year ago declined to sanction the line at the present time for the reasons stated in his Despatch No. 16 of the 20th January, and I am not prepared to urge the immediate commencement of the work even now, but I think that its ultimate execution may be sanctioned, and that for the reason already given, it should be commenced at such time as will allow of the earthworks, culverts, tunnels, and all similar work being completed by the time that the Nánu-oya railway is finished. I do not for a moment forget or overlook the depressed financial state of the Colony to which Sir M. E. Hicks-Beach referred, or the inexpediency of adding to its burdens without a certainty of the outlay being profitable. It is precisely because I think that the railway now asked for will be profitable, and will materially help forward the Colony, that I would advocate its construction. Though the coffee cultivation has suffered so severely from leaf disease and other causes, yet the Haputalé plantations are among the most productive in the Island, and the opening of railway communication would bring with it the opening of new and equally productive land. The native traffic also would not be inconsiderable. In the petition of the native traders of Badulla they represented that the goods which they alone brought into the town of Badulla, or sent away from it, under all the obstacles of long cart traffic, exceeded 13,000 tons, and there is no doubt that this traffic would be largely developed by the railway.

Enclosed in my Despatch of 9th Sept., 1878, No. 306.

9. If your Lordship should be inclined to entertain favourably the prayer of the memorialists, I would suggest that a Bill be brought into the Legislative Council in the Session of 1881 to authorize the Government to borrow the sum necessary for the construction of the line, and that the work be commenced in 1882 or at such later time as may be determined after receiving the report of the Chief Resident Engineer as to the progress made with the Nánu-oya line.

10. With regard to the financial position of the Colony, and the probability of being able to provide from the current revenue for the interest of the railway loans during construction, I would draw attention to the following figures. The estimate for interest and sinking fund payable on existing Railway loans in 1881 is as follows :—

See Estimates for 1881, page 129.

		Rs.
For Main line	...	696,000
For Mátalé line	...	132,000
For Nanu-oya	...	204,000
Total—Rs.		1,032,000

The interest and sinking fund for the main line will be finally paid off early in 1882, and the interest payable on the new Railway loans, if the Haputalé extension be sanctioned, will be as follows :

			Rs.
Interest at 4 per cent. on	£275,000 borrowed for Mátalé line	...	132,000
Do. do.	£1,000,000 for Nánu-oya line	...	480,000
Do do.	£600,000 to be borrowed for Haputalé extension ...	...	288,000
		Total—Rs	900,000

In the above calculations the rupee is reckoned at 1*s.* 8*d.* The interest only is taken into account on the new loans, as sinking fund does not commence for five years after the debentures are issued. It will thus be seen that the utmost burden to be laid upon the Colony will not entail so heavy a charge as even in its present depressed state the Colony has to bear.

I have, &c.,

J. R. LONGDEN.

* See Sessional Paper No. XIV. of 1878.

Enclosure in No. 1.

To the Right Honourable the EARL OF KIMBERLEY, Her Majesty's Principal Secretary of State for the Colonies, &c., &c., &c.

MAY IT PLEASE YOUR LORDSHIP,

THE humble Memorial of the European, Sinhalese, Tamil, and Moor inhabitants of, and of others owning property and interested in, the Kandyan Principality of Uva, in the Island of Ceylon, showeth :—

1. That your Memorialists eight years ago (on the 7th June, 1872) presented a Petition to His Excellency the Governor of Ceylon praying for an enquiry by Commission and a survey, to show that Railway extension to Uva would be both feasible and profitable, as well as most desirable in the interests of the districts concerned and of the Colony at large.

2. That the result of the enquiry and survey more than bore out the estimates and anticipations of your Memorialists, showing that there was an ample and profitable traffic available for a railway line, extending from Náwalapitiya viâ the Dimbula district to Haputalé in Uva, not exceeding 72 miles in length.

3. That the result of the final surveys and estimates by the Chief Resident Engineer was to show that the nearest point in Haputalé, on which all the Uva traffic can be most conveniently converged, could be reached in 67 miles, for an estimated cost of £1,500,000.

4. That your Memorialists are pleased to learn that a contract for the first section of this line (42 miles to Nánu-oya) has been entered into; but they never doubted that when such contract was arranged, the remaining 25 miles would be carried on without any unnecessary delay.

5. That your Memorialists have been disturbed by learning that there is the possibility of the preparation of the plans being delayed through the return of Mr. Waring of the Engineering Staff, and possibly at an early date of Mr. Mosse, Chief Resident Engineer, to this Island, and also through a possible postponement of the official sanction of the second section to Haputalé to some future time.

6. That your Memorialists would point out that such delay would not only deprive the Principality of Uva of the prospect of Railway communication within a reasonable time, but it would prevent the full return to the revenue for the large outlay of £900,000 on the 42 miles to Nánu-oya, by depriving that section of the profitable Uva traffic; and, further, that such a policy would be very unfair to your Memorialists inasmuch as their claims to relief at the hands of Government have been recognised as paramount by successive Governors from Sir Hercules Robinson onwards.

7. That it was solely in the interests of the native and European residents in Uva that the survey for railway extension in 1872 was undertaken, there being no other portion of the Kandyan territory or planting districts so remote from the shipping port or so badly off for sale and economical means of transport.

8. That your Memorialists derived no direct benefit from the establishment of railway communication between Colombo and Kandy and Náwalapitiya, although for twelve years they paid export duty on their coffee produce in aid of this work; and that the greater part of the Uva Principality will be practically cut off altogether from the Government railway even when it is completed to Nánu-oya; the construction of 25 miles more to carry it to Haputalé being absolutely necessary to make that Railway available.

9. That no local Sinhalese interests of importance can be served up to Nánu-oya or until the railway reaches Haputalé; but that the native interests of Uva benefited at the latter point are amongst the most important in the Island, by far the greater part of native-grown coffee being produced within the borders of this district; and that the claims of your Memorialists are superior to those of the Galle or Mátalé Districts, or of any other district whatsoever in the Island.

10. That both Galle and Mátalé Districts are now within easy reach of the capital by railway, or by road and railway, whereas the distance of Uva is such as to render the cost, uncertainty, and risk of transport a most serious drawback to the prosperity of your Memorialists and the rest of the population; although the Uva districts are now universally recognised as the most fertile of the planting divisions of Ceylon.

11. That the Government are obliged at present to devote their attention and considerable votes of revenue to the upkeep and partial construction of three long lines of road communication in the interests of Uva: namely, that from Badulla viâ Haputalé and Ratnapura to Colombo; from Badulla viâ Lunugala to Batticaloa; from Badulla viâ Nuwara Eliya to Gampola; and from Haputalé viâ Wellawáya to Hambantota—in all about 360 miles of metalled or gravelled road, on the greater portion of which traffic and outlay would be much relieved if the railway were extended to Haputalé.

12. That many of the native population of Uva and all the immigrant labourers have at times been brought to the verge of starvation by the interruption of the present road communications with Colombo through floods and landslips; and very serious losses to Colombo merchants, Uva native traders, and especially to European and native planters, are being annually incurred not only from the heavy cost of transport—which for an average distance of 125 miles always exceeds the freight of their produce from Ceylon to England—but from the deterioration of coffee *en route* and also from the thefts and adulteration by cartmen, who sometimes take weeks and months on the road, and who occasionally disappear altogether with their loads of coffee, rice, or artificial manure. So great had the trouble and losses become that the Government have now established a system of registration on the principal Uva road, but even this does not prevent the liability to stealing and adulteration; while railway communication would give great economy as well as absolute certainty and safety in transport.

13. That in ensuring certainty and economy in the supply of rice and labour, railway communication between Uva and the rest of the Kandyan districts and Colombo is most important:

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the immigrant Tamil coolies from India could thus be carried from Colombo and Mátalé to Uva and back, and labour could be freely exchanged with the lower planting districts during a season of scarcity, the busy coffee crop time occurring at different periods of the year in Uva and in the Kandy Districts.

14. That the Principality of Uva now includes in the hands of Europeans and natives fully 50,000 acres of land under coffee and cinchona cultivation, while other new products—tea and cocoa especially—are attracting attention. That in respect of leaf disease, which has done so much to create distrust in coffee investments: whilst admitting the serious nature of the disease, your Memorialists can confidently state that throughout Uva, the most fertile and productive district of the Island, the stamina of the coffee trees has not been seriously affected, and none of the plantations have been abandoned; but, on the contrary, many of the oldest of them are in better heart and condition than they were twenty-five years ago. Your Memorialists would point out however that in order to maintain average crops and to contend successfully against disease, facilities for regular and better cultivation, which would be afforded by railway extension, are urgently needed. That there are over 30,000 acres of reserve land in private hands, and that the Government have lately sold 3,000 acres of forest land in a new division of the Haputalé district, which will at once be cleared for cultivation, while there are besides large reserves of Crown land under forest and grass both along the route of the proposed extension and elsewhere in Uva admirably adapted for culture, especially in tea, cinchona and cocoa, this part of the country being the healthiest in the Island.

15. That going back to the last official report of the Railway Commission dated August, 1878 (when the area in cultivation was less), your Memorialists would point out how ample is the guarantee offered to Government that the required per-centage of return on the outlay for 25 miles to Haputalé would be more than made up. The estimates framed in 1878 for Uva are entirely trustworthy, because the yield of produce has in no way diminished, while it may be pointed out that any possible liability to a falling-off in coffee, in the future, is more than balanced by the fact that the Commissioners made no allowance whatever for traffic in the new products—cinchona, cocoa, Liberian coffee, tea, &c.—which are already rising into great importance. The cinchona grown in the districts of Haputalé and Madulsíma is generally admitted to be among the finest and most valuable as yet produced in the Island.

16. That the cost of the 25 miles required being estimated at £600,000, the amount to be annually guaranteed for interest (4 per cent.) and sinking fund (1 per cent.) is £30,000; but the Railway Commissioners in 1878 estimated a *nett* return (after providing for all working expenses) from the Uva traffic on the Náwalapitiya to Haputalé extension of Rs 646,632; to which must be added the *nett* profit from the new Uva traffic diverted to the existing railway between Náwalapitiya and Colombo, estimated by a Railway Commission in July, 1874, at Rs. 400,768;—total, Rs. 1,047,400. This, without allowing for any saving on upkeep of roads, and if taken at 1*s.* 8*d.* per rupee is the equivalent of over £87,283, or 14½ per cent. on the outlay of £600,000, and nearly treble the required guarantee.

17. That it is to the direct interest of Government, as owners of the existing railway to Náwalapitiya and the proposed extension to Nánu-oya, to secure for their line all the profitable Uva traffic which now travels by other routes to the sea, by constructing the 25 miles to Haputalé.

18 That your Memorialists most earnestly deprecate further delay in the face of the ample financial guarantee afforded by the official estimates and also on account of the grievous loss every year to your Memorialists from the causes pointed out, as well as from difficulties attending the proper cultivation of plantations.

19 That the population of the Uva districts by the Census of 1871 was 129,000, of whom the large majority are agriculturists, and that now, including immigrant Tamils, the population cannot be less than 170,000.

20. That the objection taken by your Lordship's predecessor in sanctioning the extension to Nánu-oya—that no local native interests are directly served by that section—cannot apply to the second or Uva section, which, as your Memorialists have pointed out, will benefit most important native interests with a long-standing claim to relief.

21 That your Memorialists very earnestly trust the reasons they have adduced will convince your Lordship of the good policy, from every point of view, of expediting a work which has now been under examination and preparation for eight years; and they would humbly pray that you may be pleased to direct such assistance to be given to the Consulting Engineer as shall enable him to prepare and present the requisite plans and sections without any unnecessary delay, and that thereafter the needful sanction of the proposed work and of the calling of tenders for its construction may be given at the earliest possible date.

22. That your Memorialists would, however, in view of the serious loss to their interests from further delay, add the prayer that if it should appear undesirable—notwithstanding the above and other reasons—to sanction at an early date the construction of the Haputalé section of 25 miles in order to serve the Uva districts, your Lordship would be pleased to empower His Excellency the Governor of Ceylon to bring in an Ordinance during this year's session of the Legislative Council, empowering your Memorialists (or a certain number of them along with English capitalists) to form a Limited Company, under proper guarantees, to give railway communication to Uva at their own cost, and, if necessary, to secure running powers over the Government main line, charging traffic rates in accordance with those estimated by the Railway Commission.

And your Memorialists will, as in duty bound, ever pray.

(Signed) R. B. DOWNALL.
[and others.]

No. 2.

The Right Hon. the EARL OF KIMBERLEY to Lieutenant-Governor the Hon. JOHN DOUGLAS, C.M.G.

Ceylon.—No. 145. Downing-street, 29th April, 1881.

SIR,—I HAVE the honour to acknowledge the receipt of Sir J. Longden's Despatch No. 288 of the 31st of December, transmitting for my consideration a strongly-supported Memorial praying that the extension of the railway from Nánu-oya to Haputalé may be undertaken by the Government; or, if not, that permission may be given for the formation of a private company for the purpose of constructing the line. I have also received Sir J. Longden's Despatch No. 64 of the 5th ultimo, forwarding Mr. Mosse's report on the progress made in the works on the line between Náwalapitiya and Nánu-oya.

2. In my Despatch of the 25th of February, when commenting on the Estimates for the service of 1881, I drew attention to the fact that an increase in the estimated expenditure on railways is accompanied by an estimated diminution in railway receipts, and pointed out that this furnished a strong argument against the further extension of railways at the present time, especially in the coffee districts. That opinion I see no reason to alter. It is true that after this year no further charge will be incurred on account of the loan for the construction of the main line; but in view of a falling revenue, general depression in trade, and heavy liabilities for other public works, grave doubts must arise whether it would be prudent to raise a further loan of at least £600,000 for the construction of a line, the expense of which per mile will, it is anticipated, be greater than that of any of the lines already made in the Colony.

3. It is also to be remembered that there are other parts of the Colony, besides the coffee districts, which have claims deserving of consideration for railway accommodation, a point which the Memorialists appear somewhat to have lost sight of; and before extending further the expensive lines of the Central Province, it would be satisfactory to be able to form some anticipation as to how far the present depression in the coffee industry is likely to prove only temporary, and what are the prospects of success in regard to the newer products such as tea, cocoa, and cinchona.

4. I have thought it necessary to state plainly the arguments against the proposed extension. At the same time, I am far from asserting that there is no force in the arguments which have been advanced on the other side; but after giving them full consideration, I have come to the conclusion that at the present stage of the works on the Nánu-oya line, and looking to the existing unsatisfactory condition of the Colonial revenue, I should not be justified in giving instructions which would involve an engagement to commence the Haputalé extension within any particular time. I shall however not fail to discuss the matter with Sir J. Longden, now that he has arrived in this country, and the memorialists may rest assured that the matter will not be lost sight of.

5. To the construction of the line by a private company there appear to me to be grave objections; and I am not prepared to reverse the decision conveyed to Sir James Longden in my predecessor's Despatch No. 90 of the 23rd of March in last year.

6. Even supposing that it were found possible to form a company for the construction of a line which the Government had declined to build on the ground of its unremunerative character, and for which it refused to grant either guarantee or concession of pecuniary value, I see no reason for concluding that the same results would not ensue in this instance as in the case of the majority of railways constructed by private Companies in the Colonies. There is every probability that in a few years the Colonial Government would find itself again confronted with the same difficulties as those which surrounded the Colombo and Kandy line in its early days, and would be compelled to buy out the interests of the Company at a heavy premium, and to incur heavy expenses for the restoration of the line.

7. Additional weight is given to the general objection, in this instance, by the fact that the proposed railway is an extension of the Government main line, and that its mismanagement, or imperfect maintenance, would affect the whole of the system and greatly aggravate the local pressure brought to bear on the Government to purchase the line. But it is not solely on these grounds that I am unable to entertain this proposal. If the result should justify the anticipation of those who regard this extension as a remunerative work, no Company could enter on the undertaking unless it were granted running powers over the Government lines, and, apart from the objections which have always been felt to the granting of such powers in this country, the special engineering difficulties of the Ceylon railways would render the presence of an independent, and possibly a hostile company, a source of serious risk both to the property of the Government and the safety of the travelling public.

8. Mr. Mosse's report on the Nánu-oya line will be forwarded for an expression of the Consulting Engineer's views, and I shall be glad to learn whether, in spite of the recent bad seasons, it is still hoped to realize the profit which was anticipated from this section at the time when the undertaking was first decided upon.

I have, &c.,

KIMBERLEY.

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No. 3.

Lieutenant-Governor the Hon. JOHN DOUGLAS, C.M.G., to the Right Hon. the EARL OF KIMBERLEY.

No. 178.—*Miscellaneous.*

Queen's House, Colombo, Ceylon, 14th July, 1881.

MY LORD,—I HAVE duly communicated to the Memorialists your Lordship's Despatch No. 145 of the 29th April, conveying your decision upon their petition for the early extension of the railway from Nánu-oya to Haputalé. The only portion of that Despatch which appears at present to require any reply from this Government is the question asked in the concluding paragraph—whether, in spite of the recent bad seasons, it is still hoped to realize the profit which was anticipated from the section now in course of construction between Náwalapitiya and Nánu-oya at the time when the undertaking was first decided upon.

2. It would be very difficult, and I do not understand that it is desired of me to answer this question in precise terms, but there is no doubt that the production in coffee of the Dimbula, Dikoya, and Maskeliya districts, upon which the traffic of the Nánu-oya extension will in the main depend, has decreased to so serious an extent as to render it doubtful whether the section of the railway in question will prove a remunerative undertaking, unless the traffic of the U'va district, which does not now use the railway at all, can be attracted to it.

3. While the production of the Uva district has been but little affected by the late adverse seasons, there can be no doubt that the coffee crop on the Kandy side has of late, to a somewhat disastrous extent, disappointed expectations; the crop, now nearly over, has barely reached one-third of the average of more prosperous years, while the crop of 1881-82 does not promise favourably, though the yield will exceed, to an appreciable extent, that of the current year.

4. Under these circumstances, the question of attracting by some means or other to the railway the traffic of the flourishing district of Uva becomes one of vital importance, in view of the heavy obligation to which the Colony is committed in respect of the extension of the line from Náwalapitiya to Nánu-oya.

I am, &c.,

J. DOUGLAS.

XIX.—1881.

ARRACK LICENSE BILL.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bill intituled "An Ordinance to amend the Ordinance No. 10 of 1844, intituled 'An Ordinance to amend the Law relative to the distillation and sale of Arrack, Rum, and Toddy within these Settlements.'"

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of a Meeting of the Legislative Council, dated 19th October, 1881.

Resolved,—That the following gentlemen be appointed a Sub-Committee to report on the Bill intituled :

"An Ordinance to amend the Ordinance No. 10 of 1844, intituled 'An Ordinance to amend the Law relating to the distillation and sale of Arrack, Rum, and Toddy, within these Settlements'":—

The Hon. B. L. BURNSIDE, Queen's Advocate.

The Hon. W. H. RAVENSCROFT, Auditor-General.

The Hon. F. R. SAUNDERS, Government Agent, Western Province.

The Hon. P. RÁMA-NÁTHAN. }
The Hon. F. M. MACKWOOD. } Unofficial Members.
The Hon. A. L. DE ALWIS. }

ARRACK LICENSE BILL.

ARRACK LICENSE BILL.

REPORT.

THE Sub-Committee appointed to take into consideration the proposed Ordinance to amend the law relating to the distillation and sale of Arrack, Rum, and Toddy, within these Settlements have to report :—

That they recommend the Council to adopt an amendment to the Ordinance submitted to them, whereby the same fee would be made payable on licenses to deal by wholesale as it is proposed to impose on licenses to distil—viz., Rs. 100 ; and also an amendment whereby in prosecutions for breach of the provisions of the principal Ordinance, the prosecution would be relieved from proving a negative.

These amendments the Committee have engrafted upon the proposed Ordinance, and are reported herewith.

B. L. BURNSIDE.
W. H. RAVENSCROFT.
F. R. SAUNDERS.
P. RA'MA-NA'THAN.
F. M. MACKWOOD.
A. L. DE ALWIS.

Legislative Council Chamber,
Colombo, 24th October, 1880.

XX.—1881.

FURTHER PAPERS

RELATING TO

THE COLOMBO WATERWORKS.

(In continuation of Sessional Paper No. LI. of 1879.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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COLOMBO WATERWORKS.

No. 1.

The Right Hon. the EARL OF KIMBERLEY to Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G.

Ceylon.—No. 181. Downing-street, 3rd June, 1881.

SIR,—IN reply to Sir J. Longden's Despatch No. 66 of the 9th of February last, I have the honour to forward you the enclosed copy of correspondence* regarding the Colombo Waterworks. I wish to draw your attention to the remark in the last paragraph of the Crown Agents' letter to this Department, that the advertisement to be published in the Colony should closely agree with the general terms of that published in this country; and also to the remark in Mr. Bateman's letter of the 1st of February, that "before any work can be set out the jungle on the site of the reservoir must be cleared."

I have, &c.,
KIMBERLEY.

Enclosure No. 1 in No. 1.

The CROWN AGENTS to the COLONIAL OFFICE.

Colombo Waterworks.

Downing-street,
London, 17th May, 1881.

SIR,—I HAVE the honour to forward, for the information of the Earl of Kimberley, a copy of a report† by the Consulting Engineer for the Colombo Waterworks, in which he announces the completion of the drawings, specifications, and bills of quantities for this work. I also enclose copies of further correspondence‡ which has taken place on certain points on which it appeared to us that some additional information was required.

2. The most important question referred to in these documents is the estimate of the cost of the works, which, now that all details have been settled and the quantities taken out, can be more accurately prepared than has hitherto been possible. In his letter of the 28th ultimo Mr. Bateman states that he believes the total cost to the colony, including engineering superintendence, will not exceed £280,000 beyond that which has already been incurred. The cost of the iron pipes already delivered, which amounts to about £110,000, forms a part of this £280,000, so that the expenses already incurred are, in point of fact, limited to the cost of engineering services up to the present date—about £3,374, and the cost of local road-making—about £8,000. The total estimate may therefore be taken at £291,374, against £291,000, the amount of Mr. Bateman's original estimate in 1877.

3. There is, consequently, a slight increase in the estimated cost, notwithstanding the favourable terms on which we were fortunate enough to let the contract for the iron pipes, and the low price at which, compared with that allowed in the original estimate, we can at present deliver Portland cement in Ceylon. It is probable, however, that the effect of competition on the tenders will be to bring the cost of the work within the limits of the original estimate.

4. The specifications prepared by the Consulting Engineer are now undergoing examination in this Department, and the general conditions contained in them will be embodied in a separate form of contract. The work consists of two parts: namely, the constructional works to be executed on the spot, and the supply of iron-work, valves, fittings, cement, and other materials to be made from this country. The local work comprises the construction of the embankment of the great reservoir at Labugama, the laying of the main-pipe, the construction of the service reservoir at Colombo, and the town distribution. The whole of these services may be included in one contract, or the great reservoir and the pipe-laying might form one contract, and the storage reservoir and distribution another. The expenditure under these two contracts would be £85,000 and £75,000 respectively, and they would therefore be of sufficient magnitude to attract local and Indian contractors of a good class. The whole work, on the other hand, would be worthy of the attention of large English contractors, and we would suggest that, with the

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* Crown Agents to Colonial Office, 17th May; Colonial Office to Crown Agents, 2nd June.
† 13th April, 1881.
‡ Mr. Bateman, 1st February, 28th March and 28th April; Crown Agents, 23rd April, 1881.

object of securing the most varied competition, we should be authorized to advertise for alternative tenders, either for the whole work or for one or other of the smaller contracts. You will observe that the Consulting Engineer concurs with us in considering that intending contractors should be allowed sufficient time (not less than three months) for visiting Ceylon. The preparation of the draft contract and the completion of the lithographs will probably occupy a month's time, so that we shall not be ready to advertise until the middle of June. The tenders will consequently be returnable about the middle of September, and if the advertisement is forwarded to Ceylon as soon as it is issued here, and if the local tenders are received in the colony, contractors from India and Ceylon will have two months to prepare their contracts. The amount of the lowest acceptable local tender can be telegraphed to us for comparison with the tenders received here, in the same manner as in the case of the Jamaica railways.

5. The materials to be sent out from this country can be most advantageously contracted for by this Department, and this course will be in accordance with that which Lord Kimberley has sanctioned in other undertakings of similar magnitude.

6. The Consulting Engineer, in his letter of the 1st of February, refers to the engineering staff which in his opinion will be required for the superintendence of these important works, and in his letter of the 28th March he states that he is anxious to have an early decision as regards the appointment of a Chief Resident Engineer. The services of this officer cannot be required until the contract has been let, probably not before the end of September, but it may assist the Consulting Engineer in securing the services of an experienced and skilful engineer, and of competent assistants, if the numbers of the staff and their respective rates of remuneration are settled now.

7. The staff suggested by Mr. Bateman in his letter of the 1st February is as follows:—

One Chief Resident Engineer. * * * * * *
Two assistant engineers at £500 a year and all expenses.
Five or six inspectors or foremen.
Two or three clerks.
* * * * * * * * *

As regards the assistants, the rate of salary (Rs. 6,000) is about equal to that paid on the Railway Works, and if the expenses which are to be paid in addition are properly defined there appears to us to be no objection to Mr. Bateman's proposals under this head. The suggested number of inspectors is large, but the nature of the work requires a somewhat ample allowance of this kind of superintendence. It will however be desirable to send out as few as possible in the first instance, as the Resident Engineer will probably find foremen in the Colony possessing considerable experience in embankment and reservoir work, with which the officials of the Public Works Department have had ample opportunities of becoming familiar.

8. On receiving Lord Kimberley's authority to proceed we will cause the draft contract to be completed, and will forward to the colony copies of it and of the lithographed plans and specifications, as well as of the advertisement which we shall issue, and with the general terms of which that to be published in the colony should closely agree.

I have, &c.,
M. F. OMMANNEY.

Sub-Enclosure No. 1 in Enclosure in No. 1.

MR. BATEMAN, C. E., to the CROWN AGENTS.

Colombo Waterworks.

16, Great George-street,
Westminster, S.W., April 13th, 1881.

GENTLEMEN,—I AM at last able to give you all the drawings (58 in number) and specifications of the works required for supplying the city of Colombo with water by gravitation from the reservoir proposed to be constructed at Labugama. Of the 58 drawings, 55 are for works still to be let, and three for the pipe contract already entered into.

The specifications are separated, being one for the Labugama reservoir, the main pipe and service reservoir and the city piping, and for the general works to be constructed in the country—everything, in fact, with the exception of the pipes, ironwork, and cement. For the valves, ironwork, and cement separate specifications are also submitted: namely, one for the valves, sluices, hydrants, and street casings, another for the cement required upon *all* the works, and another for the wrought and cast iron work. I also send you a tender for each description of work with prices filled in, which you may consider as my estimate of the works to be executed. All these are for your approval.

The specifications and tenders have been printed for the sake of convenience in correction, and as they are now in type they may be printed off cheaply in any number you may determine upon, with such corrections as you may think proper to introduce.

In my report to you of the 6th of April, 1877, I estimated the cost of the works at £291,000, including a road to the Labugama reservoir, which is now being constructed by the Government, and for which the sum of £8,000 must be deducted, leaving the gross estimate for the works of water supply £283,000.

In consequence of the difficulty of getting stone and bricks in Ceylon, I have largely introduced concrete, which I believe will be the cheapest form of construction which could be adopted. I have, however, in all cases required the concrete to be made in certain proportions, according to the character of the work for which it has to be supplied, of broken stone which may be procured on the ground, and of Portland cement which must be despatched from this country.

My estimate of the concrete in the various works is based upon Rs. 50 per ton for Portland cement delivered at the works.

The price of the concrete will therefore vary according to the price at which the cement can be delivered, and which will have to be paid for by the contractor. A difference of Rs. 10 per ton in the price of the cement makes a difference of about 2*s.* a cubic yard of concrete.

When I made my estimate, in 1877, I estimated the cement delivered upon the works in Ceylon at Rs. 75 the ton. I am told that the best cement is now delivered at Colombo at £3 10*s.*, or about Rs. 42 the ton, including all charges except those for landing; and I am also informed that the freight on the pipes from Glasgow is only 27*s.* 6*d.* a ton. In the estimate which I now furnish to you, which has been made after all the working drawings have been completed and the quantities of each description of work accurately ascertained, I have taken cement at Rs. 50 per ton, and I have estimated the freight upon the *whole* of the materials at 35*s.* per ton. I have also estimated the general ironwork at from £9 to £12 per ton delivered in Ceylon, while I think it probable that in the present condition of the iron market it may be obtained at from £7 to £10 per ton. It may therefore reasonably be expected that the works will be taken at the present time for less than my estimate, which amounts, according to the summary table I lay before you, to about £267,000.

I must also observe that in the estimate I made in 1877 I calculated the pipes delivered in Ceylon at £8 per ton. By the contract you have made they will be delivered at less than £6 per ton, and as there were about 18,000 tons according to my estimate of 1877, there would be a saving of £36,000 on iron pipes alone, which added to £267,000 would make the total value of the work according to that estimate £303,000, being just £20,000 more than my estimate of £283,000; but, on the other hand, this sum almost entirely disappears in the difference on 7,000 tons of Portland cement, which at Rs. 25 would amount to £17,500, leaving the total difference after everything is worked out £2,500 above my estimate of £283,000 in 1877. This small difference will however most likely disappear altogether in the tenders you will receive for the construction of the work and the supply of the materials. The design in all its parts has been most carefully worked out with a view of leaving as little as possible to subsequent determination, and the specifications have with that view also been somewhat elaborately written out.

In the main pipe from Labugama reservoir to the service reservoir at Maligakanda many miles would, in the ordinary course of construction, be subject to very considerable pressure, to resist which the pipes would have required to be made of great thickness, and the line of pipes would in one, if not two instances have had to be taken out of its direct route for the purpose of discharging water into relief tanks at suitable points on the line of gradient from one reservoir to the other.

These two necessities, first of extra thickness to resist great pressure, and secondly, of relief tanks, have been got rid of by the introduction of a number of self-acting valves which will discharge water if the pressure becomes at any time greater than it ought to be. In addition to these valves I have also placed one self-acting arrangement by which, in the event of a burst occurring so as to increase the velocity in the pipe, the water from the reservoir will be at once shut off, and there will be nothing but that which the pipe contains to run away to waste.

In the arrangement for discharging the water from the Labugama reservoir I have introduced copper wire gauze strainers, which will prevent any extraneous or floating matter from getting into the pipes, as in consideration of the great capacity of the reservoir as compared with the drainage ground, I do not consider filtration will be required, and I have therefore omitted it.

The total drainage to the reservoir is nearly 2,400 acres, and the total produce will probably be not less than 100 inches in a year, or say 8 feet in depth. During the three months which Mr. Gibson spent in that country the rain was as follows:—

May 16th to 31st, 1879	...	17·6 inches
June 1st to 30th, 1879	...	16·3 „
July 1st to 31st, 1879	...	24·9 „

being 58·8 inches in two months and a half. A fall of 18 inches in 24 hours has been once recorded in Ceylon, but the maximum to be dealt with is generally considered 12 inches in 24 hours.

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The waste weir and waste water course have, however, been arranged with reference to 18 inches falling in 24 hours, and all of it to run off the ground in that time; but as the top of the embankment is 8 feet above the top of the waste weir, there would under the most extreme circumstances, even if the reservoir were quite full at the commencement of such a fall of rain as I have supposed, still remain five or six feet between top water and top bank sufficient to permit with safety even a second day's rain of 18 inches, or 36 inches in two days. Besides, however, the waste weir and waste water course, there are three 36-inch pipes from the bottom of the reservoir through which the water could be discharged, but without these I believe the greatest flood that could possibly occur could be passed with perfect safety. The reservoir itself is nearly two miles in length, and covers 176 acres. Its capacity when full is 1,373 million gallons, and its depth at the point of discharge 59 feet. However turbid the water may enter, it will have sufficient time and space in which to clarify before it is admitted into the pipes. The gross quantity of water which the district will yield will probably be over 5,000 million gallons per annum, and if a drought should continue for 200 days, and the average supply to the city during that period should be 2,500,000 gallons per day, the reservoir, if full to begin with, will not be lowered more than from 10 to 15 feet.

Arrangements are made by which the water may be drawn into the pipes for the service of the city at various heights, so as to secure the water being always drawn from near the surface, where it will be the purest and most free from discolouration or from turbidity.

Arrangements for discharging the water during the construction of the works and for passing away the floods after the works are completed have all been specially considered, and, so far as I know, no point has been overlooked. The city of Colombo is very near the Equator, and it is therefore of importance to deliver the water to the inhabitants as cool as possible. For this purpose it is proposed that all the pipes shall be covered at least two feet six inches, and that the service reservoir, which will in fact regulate the supply to the city, shall be covered with a double roof, so as to prevent any warming or heating of the water from the action of the sun. Some risk will attend the early construction of the reservoir, and it is requisite that there should not only be a careful contractor of sufficiently large views to prepare for all contingencies, but a very careful supervision both over the construction of this reservoir and all the works betwixt it and the city.

You will perceive from the drawings which are now laid before you, and from the specifications and tenders, and the calculations upon the different quantities, that the whole has been a work of considerable labour. The works are indeed of no common character, and it is requisite that there should be appointed for the superintendence of the whole an Engineer-in-Chief of knowledge and experience.

I have, &c.,
J. FRED. BATEMAN.

SUMMARY of Estimates on Detail Tenders for Works.—April, 1881.

	General Construction of Works. Cement Rs. 50 per ton.	Valves and Work in connection	General Ironwork. £9 to £12 per ton.	Pipes. Average £4 6s. 4d. per ton, with freight, &c., £6	Total. Cement at Rs 50 per ton.	Estimate for Report 1877, on then existing prices and Cement Rs. 75 per ton.
	£	£	£	£	£	£*
Labugama Reservoir ...	39,755	1,070 (freight 41½ T. £79)	1,358 (freight 96 T £192)	—	42,454	51,700
Main Pipe	38,292	4,403 (freight 204½ T £382)	629 (freight 60 T £120)	54,000 (£21,000 on 12,700 T.)	118,826	110,000
Service Reservoir	39,147	183 (freight 4 T £8)	3,535 (freight 389 T. £778)	—	43,651	49,500
City Piping	19,893	1,774 (freight 55 T. £110)	—	29,300 (£10,700 on 6,400 T.)	61,777	71,500
TOTAL—£	137,087	7,430 (freight £579)	5,522 (freight £1,090)	83,300 (£31,700)	266,708	282,700

* Including contingencies

Sub-Enclosure No. 2 in Enclosure No. 1 in No. 1.

MR. BATEMAN, C.E, to the CROWN AGENTS.

Colombo Waterworks.

16, Great George-street, S W.,
1st February, 1881.

GENTLEMEN,—IN reply to Captain Ommanney's letter of the 20th ultimo, I had hoped to have given more definite information than I find I am able to do.

In two days or so all the drawings and specifications will, I hope, be in your hands. Since my interview with Captain Ommanney in the beginning of the last month, I have had some communication with the gentleman in whose hands I should have confidence in placing the whole undertaking, but I have not yet obtained from him a promise to go out if the appointment is offered to him. * * * * * *

The work would probably require three or four years to complete, and you would have to pay the principal Engineer and his assistants for that time. * * *

He would probably require two assistant engineers—say £500 each; five or six inspectors—say two or three constantly, and two or three for a portion of the time; and two or three clerks during the whole period that the works were under execution; probably in the whole about £12,000 or £15,000.

Before any work can be set out the jungle on the site of the reservoir must be cleared. This work may at once be arranged for, as it will be additional to what will be contained in the drawings and specifications.

Yours, &c.,
J. FRED. BATEMAN.

Sub-Enclosure No. 3 in Enclosure No. 1 in No. 1.

Mr. BATEMAN, C.E., to the CROWN AGENTS.

Colombo Waterworks.

16, Great George-street, S.W.,
March 28, 1881.

GENTLEMEN,—I SPENT the whole of last week in going through the particulars of the various specifications and the estimate of the cost of the works. Various alterations were introduced, and it will be a few days before I can supply you with copies of the various documents and the drawings which you saw the other day. The gross amount of the work to be let in the country would be about £145,000, and in my opinion it would be best let in one contract; but should it be determined to divide the work, then I think that the Labugama reservoir and the laying of the main pipe might be included in one contract, the amount of which would be from £80,000 to £85,000, and the service reservoir at Maligakanda and the laying of the pipes within the city in another contract, the amount of which would be £65,000 or £70,000. In detail, the following amounts would be approximately correct:—

The Labugama reservoir from £40,000 to £45,000.
Main pipe from thence to the service reservoir about £40,000.
The service reservoir at Maligakanda from £40,000 to £50,000, and the laying of the pipes within the city about £20,000.

In addition to these there would be still to contract for, the cement, the valves, and the iron-work, all of which I have supposed would be contracted for in this country and sent out to Colombo.

On the 1st of February I wrote to you on the probable number of assistants which would be required in the superintendence of the work, and the probable gross cost which would attend such superintendence. * * * * * *

I am anxious to make arrangements for the future, and shall be glad to receive, at as early a period as I can, an intimation of your wishes with respect to the appointment of a superintending Engineer.

I have, &c.,
J. FRED. BATEMAN.

Sub-Enclosure No. 4 in Enclosure No. 1 in No. 1.

The CROWN AGENTS to Mr. BATEMAN.

Downing-street, 23rd April, 1881.

SIR,—I HAVE to acknowledge the receipt of your letter of the 13th instant, forwarding the plans, specifications, and estimates for the Colombo Waterworks, and I hope to

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be able in the course of a few days to submit the very complete and important design to the Secretary of State for the Colonies. Before doing so, however, there are a few points on which we are desirous of further information.

First, as regards the mode of letting the work. I observe in your letter of the 28th of March that you speak of letting the contract for the construction of the Labugama reservoir, the pipe laying, the Maligakanda service reservoir, and the city pipe laying, in the colony. Is there, in your opinion, any reason why this work should not also be offered to competition in this country? We should propose in any case to frame our advertisements so as to allow contractors to send in alternate tenders, either for the whole of this work or for one of the two portions of it suggested in your letter of the 28th ultimo.

If contracts are to be invited here as well as in the colony, several copies of the principal plans and drawings will be required; even for local contractors it will be convenient to be able to furnish lithographs of these drawings to those who may be prepared to pay a moderate fee for them; and I have to request you to inform us what steps you would recommend should be taken in this matter. I gather from your report of the 13th instant that you now estimate the total cost of the works at £267,000, after allowing for the reduction in the prices actually obtained for iron pipes and their freight, and then the cost of cement delivered in Colombo, as compared with the rates on which your estimate of 1877 was based. But it does not appear from the summary of which this amount is the total that either engineering superintendence or your own remuneration is provided for in this sum. Your letter of the 1st of February places the first of these items at from £12,000 to £15,000, and I have to request that you will inform us what may be expected to be the total cost of the works to the colony, including these and all other contingencies. This information is necessary in order to enable the needful financial measures to be introduced.

As regards the nature of contract to be used for the work offered to competition, it is essential that it should be in the form of a lump sum contract for all the work shown in the drawings or described in the specification, with a schedule of prices for additions or deductions. The contractor must take the entire responsibility of the quantities and information furnished to him, but the prices at which he monies out those quantities will form the schedule prices for additions and deductions.

This being so, it is necessary to consider whether, in the event of competition being invited in this country, contractors should not be allowed sufficient time before sending in their tenders to visit Ceylon, and verify the information furnished to them. It is probable that they would not avail themselves of the opportunity, but the fact that it had been afforded them would materially strengthen the position of the Colonial Government in resisting claims which might hereafter be preferred on the ground of the inaccuracy of the information or quantities supplied to the contractors.

I have to request that we may be furnished with your views on these points at your early convenience.

I am, &c.,
M. F. OMMANNEY.

Sub-Enclosure No. 5 in Enclosure No. 1 in No. 1.

Mr. BATEMAN, C.E., to the CROWN AGENTS.

16, Great George-street, S.W.,
28th April, 1881.

Colombo Waterworks.

GENTLEMEN,—In reply to your letter of the 23rd instant, I have the honour of answering the various questions which it contains.

First, as regards the mode of letting the work. There is no reason why the work to be executed in Ceylon should not be offered to contractors in this country as well as there.

My report of the 13th April specially mentions the work to be constructed in the country, by which I meant in Ceylon; as distinguished from the valves, iron work, and cement, which I took for granted would have to be contracted for in this country, as the pipes have already been.

In framing an advertisement, therefore, it should be addressed to contractors in England as well as in the colony, and I agree with you in thinking that time should be allowed for contractors in this country to go out themselves or to send a suitable representative and return with the addition of sufficient time to master the details of the work, and to prepare a tender. Three months should at least be allowed for these purposes, and tenders could not therefore be asked to be delivered before, say, the 1st of August, or sometime in that month, according to the period at which the advertisement for tenders might be published.

It is usual to deliver two copies of the tender and one copy of the specification to each intending contractor, and I would therefore suggest that when you have made such additions or alterations as may appear to you to be required a number, say 50 of each specification,

and double that number of each tender should be printed off. The number required will depend upon the mode you decide upon adopting. Is it your custom to select certain individuals who are asked to complete, or will you throw the work open to general competition? In my opinion, a selection of good and competent men is better than open competition, though by adopting that course equally good men with those selected may be omitted.

The number of drawings altogether is 58, and it is exceedingly difficult to say which of these are "principal" or secondary. Those which relate to the pipe contract may be omitted, but there would still be between 40 and 50 drawings which ought to be lithographed, if any are.

The best man for this kind of work is Mr. Thomas Kell, of 40 King-street, Covent Garden, who has done a good deal of work for me and who is constantly employed by the Institution of Civil Engineers in drawing and lithographing the illustrations to the papers read before that Society. I have consulted with him as to the probable cost of lithographing say 45 drawings. If about 25 copies of each are lithographed, the cost will be from £7 to £10 a drawing, on the average say £400.

You ask me to form an estimate of the total cost of the works to the colony, including engineering superintendence and all other contingencies. I think about £18,000 must be added to my estimate of £267,000. But in looking over my report and estimate of the 13th instant I find that I have made a mistake in the saving which may arise on the cement in the work; a difference of Rs. 10 in the price of cement would make a difference of about 4*s.* per cubic yard of concrete—and not 2*s.* as stated—so that if cement could be delivered at Rs. 40 on the works, instead of Rs. 50, as I have assumed, there would be a saving on the concrete of £6,000 or £7,000.

On the whole, therefore, I do not believe that the colony will be subject to an expense beyond that already incurred of more than £280,000.

I think the manner in which the specification and tender are drawn will meet your view with respect to the contract being in a lump sum, with additions or deductions from the drawings or specifications at the prices at which similar works are monied out.

I am, &c.,
J. FRED. BATEMAN.

Enclosure No. 2 in No. 1.

The COLONIAL OFFICE to the CROWN AGENTS.

Downing-street, 2nd June, 1881.

GENTLEMEN,—I AM directed by the Earl of Kimberley to acknowledge the receipt of your letter of the 17th ultimo, forwarding copy of correspondence with Mr. Bateman respecting the Colombo Waterworks.

2. Lord Kimberley approves of the suggestions made in paragraphs 4 and 5 of your letter with regard to the manner in which tenders for the construction should be invited and the supply of materials from this country should be provided for.

* * * * * * * *

I am, &c.,
R. H. MEADE.

No. 2.

Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G., to the Right Hon. the EARL OF KIMBERLEY.

No. 188.—*Miscellaneous.*

Queen's House, Colombo,
Ceylon, 16th July, 1881.

MY LORD,—I HAVE the honour to acknowledge your Lordship's despatch No. 181 of the 3rd ultimo, on the proposed Waterworks for Colombo, enclosing a correspondence between the Crown Agents and the Consulting Engineer, on which it is my duty to make some remarks.

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2. The expenditure up to date is given as £11,374, including £8,000 for the road to Labugama, but the following is an approximately correct statement of the Ceylon expenditure :—

	Rs.
Purchase of site for storage reservoir, Maligakanda (a portion of this may be recovered from sale of surplus land) ...	75,000
Advances to Mr. Bateman's Assistant (surveying in Ceylon) and Surveyor's assistant	6,000*
Road to Labugama	186,605
Compensation for rights to property in watershed at Labugama	14,732
For landing, preserving, and transporting pipes	23,219
Total Rs.	305,556
Or at 1*s.* 8*d.* ...	£25,463

This will increase the estimated cost by £17,463.

3. On the other hand, this sum includes the cost of transporting 300 tons of piping to Hanwella, 18 miles from Colombo, thereby saving the future contractor an expense of about Rs. 4 per ton on this quantity.

4. The estimated cost of clearing the whole space to be covered by the water of the Labugama reservoir is Rs. 7,200, and the work will be undertaken at once, in accordance with your Lordship's instructions ; but it is right that I should mention that the site of the future retaining bank and its vicinity, which I am advised is the only part of the reservoir where work will require setting out, is already sufficiently cleared for that purpose, and that felling the trees in the interior of the future reservoir before the commencement of the retaining bank is likely to set free a large quantity of surface soil now kept in place by the shelter of the trees and available for earthwork, which when the jungle is cleared will be washed away by the rain and lost.

5. Care will be taken that the advertisements issued locally shall correspond with those issued by the Crown Agents as closely as may be.

6. If Mr. Bateman desires to have on his staff one assistant possessed of local knowledge and experience, I shall be prepared to place the services of a qualified officer of the Public Works Department at his disposal.

I have, &c.,
J. DOUGLAS.

* Perhaps accounted for in item "Engineering £3,374."

XXI.—1881.

CASH BALANCES OF THE COLONY.

RETURN to an Order of the LEGISLATIVE COUNCIL of CEYLON dated the 5th October, 1881.

"That a Return be furnished showing:

1.—The Cash Balances of the Colony as on the latest date at which they have been ascertained;

2.—The Total Surplus Revenue on 31st December, 1880, including the Balances of all lapsed Votes to that date;

3.—The Balance of Railway Construction Fund, if any, on the 31st December, 1880;

4.—The Amount available for appropriation from Unclaimed Balances of the Loan Board on 31st December, 1880."

(The Hon. W. W. Mitchell.)

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

CASH BALANCES OF THE COLONY.

I.—STATEMENT showing the Cash Balances of the Colony as on the latest date at which they have been ascertained.

[For above Statement see the Blue Book of 1880, page 84.]

II.—STATEMENT showing the Total Surplus Revenue on 31st December, 1880, including the Balances of all Lapsed Votes to that date.

[For above Statement see the Blue Book of 1880, page 85.]

III.—STATEMENT showing the Balance of Railway Construction Fund on 31st December, 1880.

	Rs.	cts.
The Balance at credit of the Railway Construction Fund on 31st December, 1880, amounted to	286,421	81

IV.—STATEMENT showing the Amount available for appropriation from Unclaimed Balances of the Loan Board on 31st December, 1880.

			Rs	cts.
Amount of Unclaimed Balances of the Loan Board in deposit on 31st December, 1880			138,334	41
Deduct—Amount appropriated by Ordinance No. 4 of 1879 ... ... Rs	60,000	0		
Do. by Ordinance No. 14 of 1880 ... ... ,,	65,000	0		
	125,000	0		
Less amount expended in 1880	9,039	77		
			115,960	23
Balance available on 31st December, 1880...			Rs. 22,374	18

This Balance is not available for appropriation, as a certain sum must be reserved to meet claims that may arise, especially claims on account of minors, which it is more than probable equal to, if they do not exceed, the above balance

Audit Office,
Colombo, 10th October, 1881.

W. H. RAVENSCROFT,
Auditor-General.

XXII.—1881.

COLOMBO HARBOUR WORKS.

REPORT

OF A

SELECT COMMITTEE OF THE CHAMBER OF COMMERCE

APPOINTED TO CONSIDER

CORRESPONDENCE SUBMITTED BY GOVERNMENT ON 5TH OCTOBER, 1881.

(In continuation of Sessional Paper No. XV. of 1881.*)*

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

COLOMBO HARBOUR WORKS.

COLOMBO HARBOUR WORKS.

REPORT OF SELECT COMMITTEE OF CHAMBER OF COMMERCE.

THE Select Committee appointed by the Chamber of Commerce to consider the correspondence submitted by Government on 5th October relating to Colombo Harbour, report as follows :—

1. The Committee have carefully considered the correspondence (No. XV.—1881, in continuation of Sessional Paper No. XXIII. of 1880) with the plan of the last modified design B. furnished by Sir John Coode, and they have conferred with the Acting Surveyor-General and the Master Attendant at Colombo as to the suitability of the amended scheme to the wants of the port, present and prospective.

2. Although there is difference of opinion with regard to some details, there is a consensus of approval of the design as a whole, as the best which, under all the circumstances, has as yet been designed by the Consulting Engineer to meet the requirements of the port, and they recommend its adoption, subject to such modification and alterations as circumstances may prove to be desirable when the work has further progressed.

3. As regards the carrying out of the Harbour Works in their entirety in accordance with this design, it does not appear that the colony is in a position to do so.

It has been shown by returns compiled by the Chamber that interest and sinking fund providing for an expenditure of £800,000 was as much as could be raised, and that no more than this sum could be afforded for harbour construction ; the Legislative Council arrived at the same conclusion during last session, and determined that the sum to be expended should not exceed £800,000 ; and the Committee reiterate the opinion that no more should be spent out of colonial funds on any scheme for providing a harbour here.

4. Referring to the remark of the Crown Agents in their letter of 6th May last, that no allowance has been made for growth of commerce already belonging to Colombo, and that tonnage shows an increase of 20,000 and 60,000 tons in 1878 and 1879 respectively, as compared with 1877, the Committee would point out that this arises in a great measure through steamers of larger tonnage now taking the place of smaller ones, but that the increased amount such steamers would pay in port dues would be insignificant, whilst the quantity of goods landed and shipped, upon which tonnage dues and harbour and warehouse dues would be levied, has, as a matter of fact, been less.

5. If the whole scheme as embodied in the modified design B. is to be carried out, then, in the opinion of the Committee, the Imperial Government should provide whatever sum is necessary to do so beyond £800,000, in view of the fact that British interests other than those pertaining directly to Ceylon trade will largely benefit by the construction of a spacious and safe harbour at Colombo.

6. The Committee recommend that for the present the construction of the southern arm, in accordance with the Consulting Engineer's plan, to the length of 4,200 feet, and at a cost of £712,593, as stated in his report of 31st March, 1881, be proceeded with, leaving the consideration of further steps to be determined at a future time.

Colombo, 14th October, 1881.

XXIII.—1881.

PAPERS

RELATING TO

THE WORKING OF THE GAME ORDINANCE,

No. 6 of 1872.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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PAPERS

RELATING TO

THE WORKING OF THE GAME ORDINANCE.

No. 1.

The Hon. the GOVERNMENT AGENT, Colombo, to the Hon. the COLONIAL SECRETARY.

No. 881.

Government Agent's Office,
Colombo, 5th August, 1881.

SIR,—I HAVE the honour to forward the several reports received by me from the Assistant Government Agents and the Mudaliyars relative to the operation of the Game Ordinance, No. 6 of 1872.

2. In my opinion it has attained its object in the Western Province sufficiently—if that object be the protection, where necessary, of the food of portions of the rural population. There are however few districts of the Western Province where such protection is needed.

3. In parts of the Sabaragamuwa District the Ordinance should perhaps be worked with greater strictness than hitherto has been the case.

4. One amendment I have to suggest is the insertion of the word "wild" before buffalo wherever it occurs; or the alteration of the word "kill" to "shoot," whenever used with reference to buffaloes. At present it appears to me that under the 5th clause every person "who kills a buffaloe, whether within or without the District in which he resides," that is, anywhere in the Island, whether it be in a slaughter-house or elsewhere, unless he obtains the special license on stamp which is required by the 5th and 6th clauses of the Ordinance, is guilty of an offence and liable to a fine of fifty rupees.

5. I would suggest also in the 6th sub-section of clause 10, the insertion of the words "fresh skin or horns" after "meat of game." This would make more easy the detection of the offence it is intended to punish.

6. Although I have no other special amendments to suggest in this Ordinance, so far as the Western Province is concerned, yet I would venture to suggest that the Ordinance No. 19 of 1869, "to make provision relating to the possession and use of fire-arms" should be considered in connection with the Game Ordinance.

7. This Ordinance (the Fire-arms Ordinance) I think is capable of extensive amendment. I defer, however, making any remarks upon it until I am informed whether the Government is prepared to reconsider its provisions.

I am, &c.,

F. R. SAUNDERS,
Government Agent.

Enclosure No. 1 in No. 1.

The ASSISTANT GOVERNMENT AGENT, Ratnapura, to the Hon. the GOVERNMENT AGENT, Colombo.

No. 91.

Assistant Government Agent's Office,
Ratnapura, 25th March, 1881.

SIR,—WITH reference to the Colonial Secretary's circular of 12th January last, I beg to state that according to the reports of the several Ratémahatmayás, the Game Ordinance has worked satisfactorily in this District, and none of them recommend any alteration in the provisions.

I am, &c.,

W. CONOLLY,
Acting Assistant Government Agent.

Enclosure No. 2 in No. 1.

The ASSISTANT GOVERNMENT AGENT, Kalutara, to the Hon. the GOVERNMENT AGENT, Colombo.

No. 435.

Assistant Government Agent's Office,
Kalutara, 7th April, 1881.

SIR,—IN reply to your circular letter of the 15th January last and its annexure from the Hon. the Colonial Secretary on the subject of the operation of the Game Ordinance, No. 6 of 1872, I have the honour to report that the inhabitants of this District, whether

GAME ORDINANCE.

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in the Rayigam-kóralé, or in the remote villages of the Pasdun and Walalláwiti-kóralés, do not much depend for their food on the animals classed as "game" in that Ordinance, nor is there any demand in the larger towns of Pánaduré and Kalutara for animal food of this nature, on account of the large supplies of fish which are obtainable at all seasons of the year.

2. The Mudaliyar of the Rayigam-kóralé expresses his opinion that the Ordinance has been productive of inconvenience to the cultivators, whose crops in portions of the District where game abound are now liable to be injured by these animals, without it being in their power to protect them by the free use of their guns as heretofore, and that the Ordinance has always been regarded by the natives as a measure intended solely for the benefit of the sportsman.

3. I have myself, however, never received any complaint from cultivators either in the Pasdun or Rayigam-kóralés of injuries received by the crops from the animals referred to in this Ordinance, and I think that villagers are well able to protect their crops from such attacks without having recourse to their guns; but as this District possesses a large agricultural area, which is being annually extended, I would urge that in the interests of the cultivating class every restriction in their way for protecting their crops against these animals should be removed.

I am, &c.,
H. WACE,
Assistant Government Agent.

Enclosure No. 3 in No. 1.

The ASSISTANT GOVERNMENT AGENT, Kégalla, to the Hon. the GOVERNMENT AGENT, Colombo.

Assistant Government Agent's Office,
No. 100. Kégalla, 8th February, 1881.

SIR,—REFERRING to your circular of the 15th ultimo, I have the honour to state that large game does not abound in this District, owing to the extensive cultivation of chena, which has been carried on for successive years.

2. With the exception of one or two places in Three-kórales, there are no heavy forests to be found, such as deer and elk are in the habit of resorting to; but the headmen tell me that deer are more frequently seen to move in the proximity of villages, and this they attribute to the protection given to game by the Ordinance, and the fear which the villagers have of shooting during the close season.

3. There are no really wild buffaloes in this District. One or two may be found near isolated villages, which are called wild, but which were once tame, and have since been allowed to run loose, the owners never taking the trouble to capture them.

4. I do not think it desirable to alter the present Game Ordinance so far as this District is concerned.

I am &c.,
C. A. MURRAY,
Acting Assistant Government Agent.

Enclosure No, 4 in No. 1.

The ASSISTANT GOVERNMENT AGENT, Negombo, to the Hon. the GOVERNMENT AGENT, Colombo.

No. 57. Negombo, 21st January, 1881.

SIR,—REFERRING to your circular of the 12th instant, I have the honour to state that the Game Ordinance does not affect this District, as there is no game here.

I am, &c.,
H. W. GREEN,
Assistant Government Agent.

Enclosure No. 5 in No. 1.

The VIDÁNA MUDALIYÁR, Colombo, to the Hon. the GOVERNMENT AGENT, Colombo.

No. 126. Vidána Mudaliyár's Office,
Colombo, 23rd March, 1881.

SIR,—WITH reference to your circular letter of the 19th instant, I beg to inform you that as there is no game in my District I am unable to report on the operations of the Ordinance No. 6 of 1872.

I am &c.,
D. A. GUNATILAKE,
Vidáná Mudaliyár.

Enclosure No. 6 in No. 1.

No. 80.

Héwágam-kóralé.
Ranálé, 31st January, 1881.

SIR,—WITH reference to Government circular of the 12th instant, I have the honour to inform you that the operations of the Game Ordinance are strictly carried on during the close season, and beg to state that owing to the above the chasing of jungles for hunting the wild boar and other animals are very limited through fear that the animals prohibited by the Game Ordinance may be accidentally shot. The increase in the number of wild boars and other wild animals has been the cause of destruction to some extent to the paddy crops as well as other minor cultivations.

I am, &c.,
J. E. PERIS,
Mudaliyár.

Enclosure No. 7 in No. 1.

No. 59.

Salpiṭi-kóralé,
Kesbéwa, 30th January, 1881.

SIR,—WITH reference to circular letter from the Hon. the Colonial Secretary dated the 12th instant, I have the honour to report that with the exception of a few small kind of deer called "O'lu Muwá," which is seldom seen, there are no other game in this District.

I am, &c.,
P. PANDITHESEKERA,
Mudaliyár.

Enclosure No. 8 in No. 1.

The MUDALIYÁR of Adikári and Meda-pattus of Siyaṇé-kóralé to the Hon. the GOVERNMENT AGENT, Colombo.

No. 119.

Mahara, 16th February, 1881.

SIR,—I HAVE the honour to state that (referring to circular of 31st ultimo) I have nothing to say with regard to the operation of the Game Ordinance 6 of 1872, as there is hardly any game in my division.

I am, &c.,
L. AMERASEKERA,
Mudaliyár.

Enclosure No. 9 in No. 1.

No. 30.

Siyaṇé-kóralé,
Véyangoḍa, 21st March, 1881.

SIR,—WITH reference to the Hon. the Colonial Secretary's circular of the 12th January last, I have the honour to state that, as there is but very little or no game in my District, I regret I cannot make a report or give an opinion as to the operation of the Ordinance No. 6 of 1872.

I would, however, beg to suggest that peacocks and black mynas (Ṣela-bhiniyá) may be included in the Ordinance, so that the destroying of these birds may be prohibited, as they are most valuable birds for rearing, and are not destructive to any cultivation. Sir William Gregory, late Governor of Ceylon, had a high estimation of the latter bird.

I am, &c.,
D. H. BANDARANAIYAKE,
Mudaliyár.

Enclosure No. 10 in No. 1.

No. 35.

Siyaṇé-kóralé,
Véyangoḍa, 1st April, 1881.

SIR,—WITH reference to the 2nd paragraph of my letter No. 30 of the 21st ultimo, I have the honour to request that the animal called "dàndulénâ." or large squirrel, may also be included in the proposed Ordinance. This animal is very beautiful and is very rare to be found, inhabiting dense forests; they are, besides, beautiful when reared in houses. This animal, as well as the two species of birds mentioned in my letter above quoted, seem at present to be almost extinct, through shooting them for pleasure without knowing their value.

I am, &c.,
D. H. BANDARANAIYAKE,
Mudaliyár.

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Enclosure No. 11 in No. 1.

No. 41.

Welisara,
29th January, 1881.

SIR,—WITH reference to the circular dated the 12th instant, addressed to you by the Hon. the Colonial Secretary and forwarded for my information and early attention, I have the honour to state that there is no game such as that contemplated by the Ordinance No. 6 of 1872, in my District, which needs legislation.

I am, &c.,
P. DE SARAM,
Mudaliyár.

No. 2.

The GOVERNMENT AGENT, Kurunégala, to the Hon. the COLONIAL SECRETARY.

Kurunégala Kachchéri,
No. 189/193. 14th April, 1881.

SIR,—WITH reference to the circular letter dated 12th January, 1881, with regard to the working of the Game Ordinance, No. 6 of 1872, I have the honour to report for the information of His Excellency the Governor that, *in a general sense*, the Ordinance has been well carried out in this District, and the main object of the Ordinance—the protection of the food of portions of the population—has been entirely successful.

2. The wholesale slaughter of elk and deer by wandering parties of hunters has been entirely checked, and I am glad to be able to report that there is apparently a considerable increase in the number of the larger game in the District.

3. Buffaloes, by which I mean *really* wild buffaloes, are very rare in this District, though there are many in a semi-wild state, but these are very rarely shot either for sport or for their flesh.

4. One suggestion which has been made by nearly all the Ratémahatmayás of the District is that pea-fowl should be preserved under the Game Ordinance. These are, I fear, rapidly becoming extinct, and are rarely, if ever, met with in the District of Seven Kóralés, though they are plentiful in the Pomparippu District of Puttalam. It would be a great pity if these were allowed to die out, and I think that restrictions should be placed on the shooting of these birds and a close season fixed.

5. As regards the *detailed* working of the Ordinance, I fear that it is not strictly observed.

(*a*) The close season is not strictly observed, and very few, I expect, know of the existence of such close season.

(*b*) The almost universal method of shooting game is by the driving or battue system. The jungle is too dense to allow of stalking, and no native would venture out at night for this purpose.

6. It has been suggested by some of the Ratémahatmayás that the fine imposed by the Ordinance is too high, and that the Gansabhawa courts should be empowered to take cognizance of offences against the Ordinance ; but I cannot recommend any such arrangement. I think that if the Ordinance is to be enforced at all, it should be strictly enforced.

7. Before concluding my report, I beg to point out a glaring misprint in clause 5 of the Ordinance, which should read "Kóiála, Vidana Arachchi or Udaiyar"; as it now stands, the clause is unintelligible.

I have, &c.,
C. M. LUSHINGTON,
for Government Agent.

No. 3.

The GOVERNMENT AGENT, Galle, to the Hon. the COLONIAL SECRETARY,

Government Agent's Office,
No. 176. Galle, 31st March, 1881.

SIR,—IN reply to your circular of the 12th January last, calling for a report on the Game Ordinance, 6 of 1872, I have the honour to state that in regard to what is said to have been its main object—the protection of the food of portions of the rural population—it has been, as far as has come under my notice, a total failure. I have not had much opportunity of judging in this Province, for as far as this District and Mátara are concerned, from what I have seen and from the reports of the Mudaliyárs, there appears to be little or no game to be met with ; but in frequent and extensive tours through the Eastern Province between the years 1872 and 1878 I had opportunities of judging and acquiring information which did not lead me to believe that game was anywhere sensibly on the increase.

2. Except in very remote parts of the country and amongst the wildest of the inhabitants, as in Bintenna and such places, I do not think game is much regarded as a

food supply, while by Moormen and others at chenas and tanks and by tavalam drivers it has, I believe, been destroyed for sale or use without regard to season.

3. The privilege granted under the 5th clause of the Ordinance gives such an ample field for operations that the necessity for obtaining licenses, as far as the natives are concerned, has proved generally unnecessary, as the books of the different Kachchéries would show.

4. An Udaiyar's or Kóralé Vidána Arachchi's division in many cases includes an entire pattu or kóralé, at least in the Eastern Province and at Hambantota, and persons from other divisions who trade in flesh locate themselves in such of these as game is most to be found in, and pay the inhabitants at small rates to shoot and provide them with it. I think no native should be allowed to shoot without a license beyond the limits of his own village or Arachchi wasam.

5. I doubt much if attention has been given to the close season, but it is very hard to get at information on the subject; none leaks out, and yet in remote places deer skins, new and old, are to be met with in native houses at all times of the year I believe a close season to be useful if it could be enforced; but from the total absence of complaints of its infringement, which there can be little doubt is connived at by the petty headmen, there seems little use in its continuance.

6. The cheapness and ease with which firearms are procured and retained and the increased number of them throughout the country are doubtless at the bottom of the destruction of game. It would be difficult, if not impolitic, to restrict this as far as all guns already licensed are concerned, but I think on future registration a much higher rate than now prevails might be levied both for new licenses and transfers. Guns are not, except in a few exceptional cases, required for protection from elephants or other wild animals, and as articles of amusement and luxury are fair objects for taxation. With this at an enhanced rate the further increase in the number would be checked; and by requiring licenses to be taken out for shooting game throughout the year, which might be granted either at not less than Rs. 10 per annum, or for portions of the year, as for one month at a time, at proportionate rates—as this might induce natives to take licenses which the higher rate would prevent, improvement in the Game Laws might be effected.

I forward copies of the reports of my Assistants at Hambantota and Mátara.

I have, &c.,

W. W. HUME,
Government Agent.

Enclosure No. 1 in No. 3.

The ASSISTANT GOVERNMENT AGENT, Tangalla, to the GOVERNMENT AGENT, Galle.

Assistant Government Agent's Office,
Tangalla, 25th March, 1881.

No. 136.

SIR,—I HAVE the honour to acknowledge the receipt of your letters, which I regret have not received earlier attention.

2. The enquiry of Government is directed, as I understand it, to ascertaining how far the Ordinance No. 6 of 1872 has proved effective in preventing the wasteful destruction of game, considered as a source of food supply to the people, and, supposing the measure to have failed in securing the object in view, what new regulations are necessary to render the purpose of Government more effective.

3. On the first of these points I believe that I am only expressing the opinion of all who are capable of judging in the matter, when I say that the Game Law has entirely failed in carrying out the intention of Government, because the Ordinance was so loosely framed as in practice to impose no restraint whatever upon the natives, while the destruction of game has been every year progressing the more rapidly as the possession of firearms has become more general.

4. The 5th clause of the Ordinance, as pointed out by the Hon. the Planting Member in Council, gives a man as much freedom as he can possibly desire, and a range of from perhaps 50 to 80 miles from his house.

In the Hambantota District, for example, the people of the Mágam-pattu claim a right to shoot from the Wellawaya river to the Kumbukan áru, a distance of 68 miles, over the finest game country in the Island, and the inhabitants of the Hambantota town have for years, without any licenses, been in the habit of making a trade of selling jerked venison and buffalo meat killed on the banks of the Yála and on the Bottana plains 50 miles from their houses.

5. As the law stands there is no disputing this claim; but I do not believe that it was the intention of the framers of the Ordinance to give this liberty, but rather to confine every man to his own Arachchi wasam instead of to the Kóralé Vidana Arachchi's district, which, in the instance I have given, comprises the whole of the Mágam-pattu, and in many similar cases extends over game countries of equal magnitude, into which no European sportsman can enter without a license.

6. So far, therefore, as the natives are concerned, the Ordinance has imposed no restraint, and has remained a dead letter except in the few cases of prosecution which the

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killing of game in the close season has given rise to. The number of these prosecutions is in ludicrous contrast to the amount of game actually killed in the close season, and gives a very wrong impression of the general and flagrant disregard of the provisions of the Ordinance in this respect. From my own observation I am satisfied that the pursuit of game during the close season is almost as unremitting as it is during the open months, and I confess that I do not see, having regard to the localities in which the law is infringed, how these breaches of it can be detected and punished unless Game Laws of a much more stringent character are passed.

7. The return of the number of guns registered in the different Kachchéries throughout the Island, asked for by the Planting Member, will convey some impression of how general the possession of firearms has become, and this has been particularly the case amongst the rural population in the wildest, and therefore the best sporting districts in the Island, where the villagers are to a man in possession of firearms.

8. The large reward paid for the destruction of leopards and bears has done much to promote this general acquisition of arms, a large number of which are not registered and therefore do not appear on the Kachchéri returns.

9. In India the importation of cheap arms is practically prohibited by the heavy import duty which, for political reasons, has been imposed as a bar to this traffic; but as we are not under the necessity of taking such precautions the possession and use of firearms is general, and it appears to me that any serious attempt to preserve game must begin with imposing a restraint on the use of arms for sporting purposes.

10. I would not interfere with the possession or carrying of arms except for sporting purposes; but I would absolutely prohibit the killing of game throughout the year except on license, and the prohibition should extend to all times and to all places The license should not be under Rs 10, and the punishment for infringing the law should be fine or imprisonment, or both, by a Police Court.

11. I am quite satisfied that nothing short of this will prevent the complete extinction of game, and unless Government is prepared to go these lengths it would be better to have no Game Law at all than one which can be broken with impunity on all occasions.

12. It will probably be objected that a measure of this stringency will press heavily upon the people dwelling in the wilds, to whom the flesh of game is a food supply, and this for a time was a belief I indulged in; but, as a matter of fact, it is not true that even in the wildest parts of the Island the flesh of game any longer forms a material portion of the food supply of the people, whatever may have been the case a few years ago, and it is only by the imposition of a restraint of the nature I have suggested that game can ever again be expected to multiply sufficiently to afford a food supply to the people; and I believe that to confine the killing of game to one or two men in a village—which the obligation to take out a license would certainly do—would ultimately confer the greatest benefit on this class of people who are now so improvidently killing off the game with "no thought for the morrow," and often for the mere purposes of trade.

13. All up the east coast of the Island the deer and buffalo have been shot down in vast numbers to sustain this traffic in flesh, the villagers who kill the game getting only a few pence for the carcase of each animal delivered to boatmen from non-sporting districts. So complete in some instances has been the destruction of game, that where ten years ago deer could be counted by the hundreds not a single animal now remains. This is notably the case in the Hambantota District, where it is useless now to look for deer south of the Yála river and in situations where ten years ago I have seen them in scores.

14. It is impossible to ignore these facts in framing a new Game Law, and it should be fully recognized that the choice lies between permitting the gradual extinction of game by a process which the present law entirely fails to check, or imposing such restraints as shall conduce to the increase of game, and consequently to an increase of that food supply which the people have been deprived of by their own thoughtless conduct.

15. The temptations to break through the close season are so great and the opportunities so good, that I very much doubt the utility of having one, and, provided all persons shooting game are compelled to take out a license, I think this restraint may be removed, especially as the breeding seasons are very uncertain, and in high and low districts quite different.

I have, &c.,

F. C. FISHER,

Assistant Government Agent.

Enclosure No. 2 in No. 3.

The ASSISTANT GOVERNMENT AGENT, Mátara, to the GOVERNMENT AGENT, Galle.

Mátara Kachcheri,

No. 164. 7th March, 1881.

SIR,—WITH reference to the circular from the Colonial Secretary dated January 12th, 1881, I have the honour to report that the Ordinance No. 6 of 1872 appears to have worked successfully in this District. The headmen report that the object of the Ordinance has been to a great extent attained, and that, partly through its provisions, food is

abundant in the rural districts. I do not consider, however, that the effect of the Ordinance can be fairly tested in the Mátara District, as there is no lack of food, and, judging by the very few cases that have been instituted under this Ordinance, I am disposed to think that the people have had little temptation to infringe its provisions.

With regard to the 2nd paragraph of the Colonial Secretary's circular, I have the honour to state that I have no alterations to propose.

I am, &c.,

H. W. BRODHURST,
Assistant Government Agent.

No. 4.

The Hon. the GOVERNMENT AGENT, Kandy, to the Hon. the COLONIAL SECRETARY.

No. 607/8,220.

Kandy Kachchéri,
19th May, 1881.

SIR,—WITH reference to your circular letter of the 12th January last, I have the honour to annex copies of reports from my several Assistants on the subject, and to state that I concur in the view that the Ordinance has been a failure from the beginning.

2. The report of Mr. LeMesurier is entitled to much weight, for he is a great sportsman, and in his shooting excursions in wild parts has had great opportunities of testing the working of the Ordinance.

3. It has not been successful in its main object, and it would be difficult to say in what respect it has been of service.

4. I consider that the only remedy is to be found in a yearly license to carry and use firearms.

I am, &c.,

F. B. TEMPLER,
Government Agent.

Enclosure No. 1 in No. 4.

The ASSISTANT GOVERNMENT AGENT, Badulla, to the Hon. the COLONIAL SECRETARY.

No. A/62.

Badulla, 27th March, 1881.

SIR,—IN reference to the Colonial Secretary's circular of the 12th of January last on the subject of the Game Ordinance of 1872, I have the honour to report as follows:—

1. I doubt that the main object of protecting the food of portions of the rural population has been much served. The Ordinance has been now nearly ten years in force, and there is no reason to believe that game is any more plentiful than it formerly was in this District, or that the people have derived more food than before from this source

2. To me it appears that in the protective measures adopted the main defect lay in the fixing of a close season, or at all events in the time of year and the length of the period selected during which the killing of game was prohibitory. Singularly few instances of violation of the provisions of the Ordinance have been brought to light; but it should not be argued from this fact that the cases of illicit killing were really few.

3. Doubts have been expressed to me by experienced sportsmen that the close season was well chosen in regard to the breeding time of elk and deer; and it is certain that it was not happily selected in regard to the wants of the people, for it embraced some of those months in the year when they were most in need of food, and when natural circumstances were most favourable to their success in hunting.

4. It is questionable whether to deprive the people for several months in succession of hunting privileges is desirable at any time. Such rules must only affect wild, remote, and thinly-populated Districts, where violations of them must be difficult to discover, particularly where, perhaps, most persons interested are in concealment. The villager needs protection mostly from strangers to his kóralé who make hunting a trade: but there is reason to suspect that residents and strangers have found it convenient to fraternize upon this question and screen each other.

5. Apart from this consideration, a close season is calculated to concentrate too much the campaign (if I may so speak) of sportsmen and pot-hunters. Surely the usual hunting grounds are likely to become shunned by game.

6. In view of an amended Ordinance I would make the following suggestions:—

(*a*) The limits within which a resident may hunt should be more distinctly laid down. In this District every man should be at liberty to hunt anywhere in his own korálé. European residents should not be admitted, however, to this privilege, and this should be clearly set down in the new Ordinance.

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(b) There ought to be two sorts of licenses issuable—licenses for a Province only, and licenses for the whole Island. Inconvenience has arisen through the fact that hunting grounds of three Provinces, the Central, Southern, and Eastern, have merged into each other.

7. I would be disposed to leave the law affecting wild buffaloes as it is.

I have, &c.,

ÆLIAN A. KING,
Assistant Government Agent.

Enclosure No. 2 in No. 4.

The ASSISTANT GOVERNMENT AGENT, Nuwara Eliya, to the Hon. the GOVERNMENT AGENT, Kandy.

The Kachchéri,
Nuwara Eliya, 2nd May, 1881.

SIR,—WITH reference to the Hon. the Colonial Secretary's circular of the 12th January last, calling for reports upon the operation of the Game Ordinance, I have the honour to state that in those portions of this District which are inhabited by Europeans as well as natives, game forms no material item of the food of the people, whilst in the lowlying and remote palátas of Héwáheta and Walapané the Ordinance, so far as it can be enforced, only protects this item of their food by debarring them from the use of it during certain months of the year, and it is my opinion that as the breeding of game is tolerably evenly distributed throughout the year, the advantage gained by setting apart certain months as a "close season" is not sufficient to prevent the Ordinance from defeating its own object to the same, or nearly the same, extent to which its provisions are enforced. Were it the case that the close months were the breeding months, the Ordinance could not but work to the benefit of the people in this respect; but if such be not the case (which I believe is now generally admitted) I think the restriction should be removed.

I have said "to the benefit of the people," adopting the spirit in which the Ordinance was framed; but if I might venture to express an opinion which is not apparently quite in accordance with that held by the Government at the time this law was passed, I would submit that the gradual disappearance of game and the consequent discontinuance of hunting as one of the means of obtaining a livelihood has been throughout the history of the world but a prelude and harbinger, as it were, of the development of agriculture and the more permanent industries of civilization, and that the failure of this Ordinance to attain the end designed (which failure I attribute *not* to a disregard of its provisions, but to the causes above noted) need not be a subject for great regret.

In my letter No. 394 of the 16th July last I recommended the abolition of the close season, and suggested as a substitute the imposition of a duty upon hunting and shooting licenses, but that was with a view to the preservation of game for sporting purposes, and with the same intention I would beg to repeat that recommendation; but I will not pretend when so doing that I have in prospect any protection of the food of a portion of the rural population, for the duty on a shooting license would be as prohibitive to the poorest classes as the extirpation of game itself.

With reference to that portion of the Ordinance which restricts the destruction or capture of elephants, I have the honour to refer you to my letter No. 153 of the 21st March, 1880 (copy of which is hereto annexed), and to repeat the opinion and recommendations therein contained.

I have, &c.,

H. HAY CAMERON,
Assistant Government Agent.

Sub-Enclosure No. 1 in Enclosure No. 2 in No. 4.

The ASSISTANT GOVERNMENT AGENT, Nuwara Eliya, to the Hon. the GOVERNMENT AGENT, Kandy.

No. 153.

The Kachchéri,
Nuwara Eliya, 21st March, 1880.

SIR,—I HAVE the honour to annex for your perusal copy of a letter received from Mr. W. H. Walker, of Pundalu-oya, dated 6th instant, relative to the damage caused by elephants to the grass fields on his estate. I have informed Mr. Walker that the proviso in the 1st clause of Ordinance No. 13 of 1869 will justify his shooting any elephant he may find trespassing on his estate, but that I cannot authorize him generally to shoot elephants unless he takes out a license under the 2nd clause of the Ordinance.

I have the honour to state that complaints of the depredations of elephants in the District are not rare, much damage being done by them, especially in the neighbourhood of Mr. Baker's estate at Maragastota, and I think it is well worthy of the consideration

of Government, whether the restrictions of the Ordinance should not be entirely abrogated as far as this District, at least, is concerned. The forests which separate the different coffee districts of Maturata, Ramboda, Pundalu-oya, Lindula, Badulla and Uda Pussellâwa are at no point more than ten miles in breadth, and these are traversed by bridle-paths connecting the coffee districts with each other and with Nuwara Eliya itself. I do not think that the number of elephants inhabiting these forests can be large, but it is large enough to cause much inconvenience and annoyance to the proprietors of cultivated lands on their immediate precincts, and to render travelling alone or at night upon these roads extremely uncomfortable, if not dangerous.

The elephants of this District have not, I am convinced, any connection with the herds of the Bintenna, where the preservation of the species may be continued with advantage, and to which I am strongly of opinion such preservation should be confined.

I would therefore recommend, as a first measure, the organization of a succession of kraals upon the plains of Kándapola, Hewa Eliya, Maha Eliya, and Sita Eliya, the elephants being driven to them from the forests adjoining them respectively. This can be arranged without expense to Government, and by this means all useful animals will be secured and only the unprofitable and dangerous destroyed. It will be seen, therefore, that the object of my proposals is by no means one of wholesale slaughter, but merely of establishing the fact that the forests of this District are no longer to be regarded as a breeding ground for animals whose presence is inimical to the interest of the cultivator.

I have, &c.,

H. HAY CAMERON,
Assistant Government Agent.

Sub-Enclosure No. 2 in Enclosure No. 2 in No. 4.

The ASSISTANT GOVERNMENT AGENT, Nuwara Eliya, to the Hon. the GOVERNMENT AGENT, Kandy.

No. 394.

The Kachchéri,
Nuwara Eliya, 16th July, 1880.

SIR,—I HAVE the honour to forward herewith a letter received from Mr. John Baker,* of Nuwara Eliya, and numerously signed by other proprietors of cinchona plantations, and I beg that you will be pleased to give the matter your favourable consideration.

I should myself recommend that the close season be entirely abolished as being inapplicable to this country, and that the requisite amount of protection be secured to game by a duty upon hunting or shooting licenses.

I am, &c.,

H. HAY CAMERON,
Assistant Government Agent.

Enclosure No 3 in No. 4.

The ASSISTANT GOVERNMENT AGENT, Matále, to the Hon. the GOVERNMENT AGENT, Kandy.

No 190/375.

Mátalé Kachchéri,
29th March, 1881.

SIR,—REFERRING to your circular 144/8,220 of the 20th instant, I have the honour to report that I believe the Game Ordinance has been of benefit in securing the game from the depredations of traders in dried meat, and reserving it as food for the people, though in the remote parts of Laggala and Gongala kóralés there is, undoubtedly, a certain amount of illegal hunting which it is very difficult to stop.

I am, &c.,

H. L. MOYSEY,
Assistant Government Agent.

Enclosure No. 4 in No. 4.

The OFFICE ASSISTANT to the Hon. the GOVERNMENT AGENT, Kandy.

I SUBMIT that the Game Ordinance No. 6 of 1872 has totally failed in its main object—the protection of the food of portions of the rural population.

2. The only effect it has had is to throw obstacles in the way of European sportsmen, to the general evasion of its provisions, and to the wider and more systematic practice of night shooting, the most destructive form of all.

3. In the first place, under the provisions of the Ordinance it is necessary for a sportsman to take out licenses for every District in which he wishes to shoot, so that he is, if he visits three or four Provinces, really subjected to a heavy tax, and one which I do not think the Ordinance contemplated.

* Not printed.

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4. As a matter of fact, however, this tax is generally evaded, the number of licenses issued being out of all proportion to the number who shoot.

5. Natives never take out a license at all, and a recent statement prepared for the Legislative Council shows how very few have been prosecuted for infringing the Ordinance. Again, the provisions of the Ordinance are generally evaded, and evasion is very easy.

6. The Districts where game is plentiful are very thinly populated, and it is quite impossible to exercise any supervision over them. In many places the headmen themselves connive at the destruction of game; but as far as the game districts of this Province are concerned, in the majority of cases the game is shot by travelling Moormen, who dry the meat and make money by its sale.

7. These men are never caught, and indeed it would be very difficult to detect them. They have a thorough knowledge of the country and where game is to be found, and they are seldom, if ever, accompanied by any of the villagers in the neighbourhood. Their shooting is generally done secretly, and the number of head they kill during the year is very large, and this brings me to the third point—night shooting.

8. To better escape the chance of being prosecuted for deer shooting, much of their murderous work is done at night in the dry (N.B. the close)season by watching on plat forms over pools of water. Here they get many shots every night and wound three or four times as many as they kill on the spot, the wounded animals generally escaping, but only to die in the jungle a short time afterwards.

9. The result of this wholesale destruction is that the deer are fast disappearing. I can myself testify to their scarceness now in places where a few years ago they used to be very numerous—in the Park country and in Tamankaduwa, for instance; and I am convinced that if no steps are taken to put a stop to the evil they will soon disappear altogether.

10. It can hardly be said that the object of the Ordinance was to throw impediments in the way of lawful sport, or that it contemplated the preservation of game for the profit of the bands of Moors who infest the game districts. These men do not constitute the rural population, and they are the persons who shoot the greater portion of the game. The Ordinance is faulty in another respect—namely, in the reservation at the commencement of clause 5—but this is acknowledged to be an error.

11. The question remains, What can be devised to prevent or mitigate this destruction? I would submit that the best plan would be to repeal the present Ordinance and to levy a yearly tax on the carriage of firearms similar to that imposed in England. The tax would be easily recovered, and it could not easily be evaded. It would not fall hard on those who wished to shoot, as the game they would kill would soon repay them for the outlay, while it would prevent the present indiscriminate use of firearms, which is both destructive to game and a standing damage in other respects to the community.

21st March, 1881. C. J. R. LE MESURIER.

No. 5.

The GOVERNMENT AGENT, Anurádhapura, to the Hon. the COLONIAL SECRETARY, Colombo.

Anurádhapura Kachchéri (on Circuit),
No. 177. Alut-oya, 16th June, 1881.

SIR,—I HAVE the honour to reply to your circular letter of 12th January last.

2. The provisions of Ordinance No. 6 of 1872, so far as they provide for a close season for game, have been beneficial; and so far as they require a special license for the shooting of buffaloes, have tended to the protection of the few herds of wild buffaloes still remaining.

3. The Ordinance has failed, on the whole, to put a stop to battue and driving of deer and elk; and having failed in that, it has not been greatly successful in what you describe as its main object—the protection of the food of portions of the rural population.

4. In the wild forests of Ceylon it is difficult to protect the game from battue and driving by men who camp in the jungle for that purpose. It is not safe for one or two people to seize them, and they are likely to make off before a large body could be upon them, and there are not people available in the wilds to go to seize a camp.

5. The direction in which amendment of the Ordinance is required is to make the prevention of battue and driving a reality.

6. I have kept back this report to enable me to send with it the opinion (herewith enclosed) of Mr. H. W. Varian, the Forester of this Province, whose knowledge of the jungles and love of sport render him an admitted authority on a subject of this nature.

I am, &c.,
JOHN F. DICKSON,
Government Agent.

Enclosure in No. 5.

The FORESTER, North-Central Province, to the GOVERNMENT AGENT, North-Central Province.

No. 108. Trincomalee, 5th June, 1881.

SIR,—WITH reference to your letter No. 98 of the 2nd instant, I have the honour to forward herewith my report on the subject referred to in the annexed circular, and copy of the Ordinance No. 6 of 1872.

I am, &c,

H. W. VARIAN,
Forester, North-Central Province.

Sub-Enclosure in Enclosure in No. 5.

SIR,—As I am invited to give a full expression of my opinion on the subject of the Game Ordinance, No. 6 of 1872, I am bound to say that it never came into force, except to a very limited extent, and I am also of opinion that it is almost impossible to bring it into action in such a wild country as the parts of Ceylon in which most game is to be found.

The greatest enemies to game are gangs of men who come from the large towns of Ceylon and India. They form camps, and as they bring with them supplies of everything that the "out-of-the-way villagers" require, such as guns, ammunition, cloths, &c., they have no difficulty in getting these men—who as a rule are blind to their own interests—to kill buffaloes, sambar and spotted deer for them at a very small cost. The meat is dried and taken away in tavalams to the towns. I have made a calculation which gives these traders a profit of at least 300 per cent. on their expenditure, which accounts no doubt for the enterprise displayed by them.

I also beg to point out that if Ordinance No. 6 of 1872 was actually put in force, the rural population whom it was meant to benefit, and the Veddahs, who live principally on game, would be actually starved for five months in the year. There is no particular breeding season for wild buffalo, sambar, or spotted deer. In the dry season they are much easier shot than in the wet, as they come down to the water holes, and these are favourite places for killing them with all natives.

The Ordinance referred to prevents the few Europeans who shoot in the Island killing buffaloes and deer; but the numbers shot by them are so insignificant as to be unworthy of notice, compared with the wholesale slaughter carried on by the gangs of professional butchers referred to.

With reference to the last paragraph of circular dated 12th January last, all I can only propose in the way of game preservation is that a very heavy tax be put on guns, and the Government Agents be entitled to remit the duty, where they see it necessary—in cases of people who have to protect their crops and find food; but as it stands at present, guns are so plentiful that some small villages hold more than two hundred, which I am of opinion is a thing that should not be allowed.

I am, &c.,

H. W. VARIAN,
Forester, N.-C. Province.

No. 6.

The GOVERNMENT AGENT, Batticaloa, to the Hon. the COLONIAL SECRETARY.

No. 108/37. Paddurupu, 8th April, 1881.

SIR,—WITH reference to your circular letter of 12th January last, I am not prepared to recommend any material alteration of the Ordinance No. 6 of 1872. I have been at some pains to get at the facts of the question at issue, and I find:

1st.—That the Ordinance is generally felt by the Vanniyas and Ratémahatmayás to be a useful provision against the exhaustion of a material item towards the food resources of the people most requiring special protection from Government, viz., the Veddahs and Sinhalese.

2nd.—That there is an *indirect* benefit from it, in that the destruction of private buffaloes, on the plea of their being wild or on no plea at all, is of necessity largely checked by there being no excuse for shooting at all during so many months of the year.

I must perforce admit that the Ordinance is largely evaded by the Veddahs and Sinhalese themselves, and that such should be the case is not to be wondered at when it is remembered how difficult it is for the law to reach them, and that they have so strong a feeling that the game is peculiarly their own property. I must confess, even to a feeling of unwillingness, to enforce the law against them too strictly, so long as any breach of it is really confined to the object of securing food for the moment only, and not for trade purposes, to prevent which latter it is that I would not willingly see the restriction of a close season abolished.

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I should perhaps report that, while the other Vanniyas and Ratémahatmayás are in favour of the restriction being retained, those of Karavaku (the jungles of which are far away from the mass of the people of the pattu), of Chammanturai, and of Akkaraippattu ask for an abolition, though it is only upon the ground that the Veddahs and Siṇhalese may not be impeded in their search for food, already insufficient. To this the answer is, that while for the moment they might be better off, before long they would be worse off than ever through the exhaustion of the game by unrestricted shooting and trading upon its results.

The remedy for the insufficiency of food alleged must be rather found in communications with them being opened up, continuance of chena licenses, and assistance with seed paddy for paddy cultivation, as has been tried with some success in Bintenna.

Panowa Ratémahatmayá is considerably exercised by a question somewhat outside the Ordinance, though connected with it, viz., the necessity for preventing the removal of game or buffalo flesh from one principal headman's division to another, he having a large and special interest in it by reason of his personally owning great numbers of cattle; but this necessity is being met by Village Tribunal rules which, if approved, will require that the skin be produced with the flesh, while it is yet uncooked or dried, so that buffalo meat may be distinguishable from elk meat (at present a difficulty), and by the headman (the nearest) being required to give a certificate that he has satisfied himself as far as reasonably possible, that the animal has been lawfully shot. This officer would have *all* shooting under license only, and the license to shoot buffaloes expressly worded "for wild buffaloes only"—an apparent omission in the Ordinance, but one which I presume is generally understood. But this would be needlessly stringent, not to say vexatious, and calculated to invite a still more general evasion of the law than at present exists. It is a curious fact in connection with his division that it is the only one in which the people are known to eat wild pig, the animals, numerous though they be, being looked on everywhere else as unclean.

The report of my Assistant for the Trincomalee District is annexed.

I have, &c.,
G. E. WORTHINGTON,
Government Agent.

Enclosure in No. 6.

The ASSISTANT GOVERNMENT AGENT, TRINCOMALEE, to the GOVERNMENT AGENT, Batticaloa.

Trincomalee Kachcheri,
No. 172/15. 30th March, 1881.

SIR,—WITH reference to the Hon. the Colonial Secretary's circular of 12th ultimo, I have the honour to annex copy of a report dated 22nd February, 1881, from the Vanniya of Tampalakam-pattu, who, with the other chief headmen of this District, is of opinion that the Game Ordinance No. 6 of 1872 has been successful in preventing people from other Districts from coming and killing for curing and removal the game in this District, and in thus preserving elk and deer for the inhabitants of the villages.

I very much doubt whether the close season is strictly observed by the villagers. Licenses are taken out only by Englishmen; a Siṇhalese man paid for one, but returned it when he found that he was not allowed to remove the flesh from the District.

I am, &c.,
R. MASSIE,
Acting Assistant Government Agent.

Sub-Enclosure in Enclosure in No. 6.

The VANNIYA of Tampalakam-pattu, to the ASSISTANT GOVERNMENT AGENT, Trincomalee.

No. 27. 22nd February, 1881.

I, Vanniya, of Tampalakam-pattu, humbly beg to report that, so far as I know, the Game Ordinance No. 6 of 1872, referred to in the order No. 22 of the 3rd instant, is in operation in my division, tending to beneficial results, as strangers are not allowed to kill game, dry the meat, and remove it as they had done hitherto; and by the increase of the number of elk and deer during the time they are not allowed to be killed the meat thereof serves a great deal as provisions to the people during the ensuing months of the winter season, in which they feel the scarcity of food.

V. VISIWANATI,
Vanniya.

No. 7.

The GOVERNMENT AGENT, Jaffna, to the Hon. the COLONIAL SECRETARY.

No. 246. Jaffna Kachchéri, July, 1881.

SIR,—IN reply to your circular of the 12th January, 1881, I have the honour to submit that I have forwarded copies of it to the Assistant Agents of Mannár, Mullaittivu, and Vavúniya-Viláṅkulam for their opinion and report. I annex copies of the reports of the Assistant Agents of Mannár and Mullaittivú, who is now also acting as Assistant Agent of Vavúniya-Viláṅkulam.

In reference to remarks in those reports I think it as well to refer to the circumstances which led, as I believe, to the framing of the Ordinance No. 6 of 1872.

The provisions of the proposed Game Ordinance were discussed at the first meeting of the Government Agents at the Pavilion, in Kandy, in 1872.

From what I could then gather it appeared that it had been represented to the Governor that in consequence of the wholesale destruction of game in the remote districts of the Island, the inhabitants of those districts were being deprived of one of their chief sources of food; whilst, as represented by Mr Morris, then Acting Government Agent of Galle, the wanton and wholesale destruction of buffaloes, especially in the Hambantota District, would shortly result in the very great deterioration of the breed of buffaloes in the Island, much to the injury of the agricultural classes. To remedy the evils complained of it was proposed to proclaim a close season for game, viz., deer and elk, during which time no game was to be shot in any District, and to prevent the killing of game by strangers in any pattu or korale of a District without licenses; to put a stop, if possible, to the wholesale destruction of game by gangs of people in the manner represented to be carried on, in the Mullaittivu District in particular; and to check, if possible, the wasteful destruction of buffaloes in those Districts in which they abounded, by obliging persons wishing to kill buffaloes to take out licenses.

The Ordinance No. 6 of 1872 was subsequently passed.

The title of the Ordinance was, "An Ordinance to prevent the wasteful destruction of Buffaloes and Game throughout the Island," and in the preamble it was distinctly stated that the Ordinance was intended to prevent the wasteful destruction of buffaloes and game throughout the Island, whereby the supply of food for the people is diminished Game was to include deer and elk.

The 3rd clause of the Ordinance provides for the close season; the 4th provides that the Government Agent may by proclamation prohibit the killing of game within certain Crown forests if considered necessary; the 5th provides for the issue of licenses, as also the 6th, 7th, and 8th, the last of which also prohibits battue or driving of game; the 9th gives certain powers to Village Communities to make rules; the 10th gives the Governor, with the advice of the Executive Council, the power to make certain regulations; the 11th and its sections provide for penalties.

I carefully watched the working of the Ordinance, more especially when first brought into operation, and am quite satisfied that it has tended on the whole to a great increase of game in the Vanni-pattus of the District. This was more especially the case in the first three or four years after the passing of the Ordinance; latterly, however, the people have found out the weak points in the Ordinance, and the wasteful destruction of game is again being carried on in the Vanni and in the Mannár District, as is truly remarked by the Assistant Agent of Mannár.

I believe, therefore, that in some points the Ordinance should be amended, so as to prevent as much as possible prosecutions under the Ordinance falling through on mere technical objections; as, for instance, whether the close season was proclaimed in the *Gazette*, and whether it was proclaimed by beat of tom-tom, cases having been recently set aside here simply because the *Gazette* in which the notice of close season was proclaimed could not at the moment be produced, and because the proclamation by beat of tom-tom could not be satisfactorily proved, although it was well known that the publication had been made in the *Gazette* and the proclamation made by beat of tom-tom.

I do not agree with the Assistant Agent of Mullaittivu, that there should be no close season, or that it should be left to the Government Agent or Assistant Agent to proclaim that shooting shall not take place at certain pools in the dry season. I am inclined to think with the Assistant Agent of Mannár, that deer breed all through the year, and that there is really no breeding season, though I believe that they breed more abundantly during the rainy season from October to February. Whether this be the case or not, however, I am of opinion that a close season should be proclaimed, and that that season should be during the dry months of the year, when the present wholesale destruction goes on in the neighbourhood of tanks and pools.

The first close season proclaimed under this Ordinance was during the rainy months from September to February. This was altered to the present close season—during the dry portion of the year—on the representation, if I recollect aright, in 1875 of certain sportsmen to Sir William Gregory. The matter was, I think, brought forward at the meeting of Government Agents in 1875.

I agree so far, however, with the Assistant Agent of Mullaittivu as to think that the period of the close season might be reduced in the interests of the people of the Vanni Districts, who are so dependent on the meat of game for food.

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The 3rd clause of the Ordinance at present runs as follows:—

It shall be lawful for the Government Agent of the Province to declare by notification in the *Gazette* and by beat of tom-tom and by such other means as shall give due publicity thereto what shall be deemed the close season in such Province or in certain districts thereof for a period not exceeding five months during the year. It shall not be lawful for any person to kill game within the Province or District during the period so declared close.

I think that since the framing of this Ordinance sufficient information must have been obtained to show what should be the close season in each Province. I would suggest, therefore, that the close season in each Province or District be notified in a schedule to be attached to the Ordinance in connection with the 3rd clause. This would render unnecessary any proclamation in the *Gazette* or publication by beat of tom-tom. The 3rd clause might be made to run somewhat as follows: —

There shall be a close season in each Province or in certain districts thereof for a period not exceeding five months during the year It shall not be lawful for any person to kill game in the Province or District during the period so declared close for such Province or District. The close season for each Province or District shall be according to the schedule attached.

For this Province I would recommend July, August, and September being made the close season. If it, however, be considered undesirable to fix the close season of any District or Province in the Ordinance, the 3rd clause might be allowed to remain as it now is, the words "*and by beat of tom-tom, and by such other means as shall give due publicity thereto*," being omitted, and an addition made to the effect that a copy of the notice proclaiming the close season in the *Gazette* shall be forwarded by the Government Agent to each court in his Province, and that it shall be the duty of the chief clerk of the court to produce such copy whenever required for purposes of evidence.

The 4th, 5th, 6th, and 7th clauses might, I think, be allowed to remain as they are. In the 8th clause might be inserted after the words "driving of game" the words "and the capture of game by means of nets." (See my letter No. 24 of 14th January, 1881, copy annexed.) The 9th and 10th clauses might remain as they stand.

I would suggest that the 1st section of the 11th clause be altered by substituting the words "fine of not less than Rs. 50" for the words "fine of Rs. 50" (as in the 2nd section of the same clause), and that in the event of any game or buffaloes being killed, contrary to the provisions of the Ordinance, by a gang of people, each one of the gang shall be made subject to the above penalty. It is known to me that in one case a magistrate attempted to divide the fine of Rs. 50 among all the defendants.

In sections 3, 4, and 5 of the same clause the words "not less than" should come before the words "Rs. 50."

If the 8th clause is amended as recommended by me, the additional words "and capturing by nets" must be inserted after the word "driving" in section 5 of the 11th clause.

In section 6 of this clause I would add the words "or fresh hides of game" after the words "meat of game." I would also make it an offence to be in possession of fresh hides of game, not only within the District, but anywhere within the Province in any District of which a close season has been proclaimed during the period of the close season in that district. (See letter No. 24 of 14th January, 1881, copy annexed, in which I reported the export during the close season of 3,400 deer skins from Point Pedro.)

The 12th clause might remain as it is.

A clause should be added giving a Justice of the Peace or headmen the power to arrest at once and take before a magistrate any person whom he may find committing any breach of the Ordinance, together with any meat, skin, guns, or instruments they may have in their possession, and it should be enacted that all guns in possession of persons found committing a breach of the Ordinance shall be forfeited, whether such guns be licensed or not, and that any persons resisting such Justice of the Peace or headmen shall be guilty of an offence and liable to such punishment as any court before which they may be prosecuted is empowered to inflict. Power should also be given to headmen to search any house for meat of game or fresh hides during the close season.

As remarked, however, by both the Assistant Agents of Mannár and Mullaittívu, there will be necessarily, from the nature of the wild districts of the country, very great evasion of the law, and I made similar remarks to those of Mr Ellis in his report (copy annexed), in reference to a proposal, in 1871, to oblige people to take out licenses for shooting wild buffaloes, on the recommendation of Mr. Morris.

See my letter No. 93 of 22nd April, 1871, from which the following is an extract:—

"Admitting the desirability of preventing, if possible, the destruction of wild buffaloes, I do not believe that the remedy proposed, viz., obliging the hunters to take out licenses, will have the effect of doing so, and with reference to the nature of the country and the means of enforcing any thing in the shape of Game Laws at the disposal of Government, I do not believe that any law that Government could pass would have the effect of preventing in any appreciable degree the destruction of wild buffaloes, as it would be found simply impossible to enforce it"

I had very great doubts as to whether the Game Ordinance of 1872 would be of any practical good. I believe, however, from what I have seen, that where there has been any attempt to carry out its provisions it has afforded the means of protecting and thus

increasing the supply of game ; and I am of opinion that Government should have the power of putting a stop at any time to the wholesale destruction of game in any district where its destruction might prove prejudicial to the people of the district ; and as I believe that the Game Ordinance does give that power, and, as I before remarked, that the enforcement of its provisions has in some instances been attended with satisfactory results, I have had reason to modify in some degree the opinion I entertained regarding a Game Law in 1871.

I am, &c.,
W. C. TWYNAM,
Government Agent.

Enclosure No. 1 in No. 7.

The GOVERNMENT AGENT, Jaffna, to the Hon. the COLONIAL SECRETARY.

No. 24. Jaffna Kachchéri,
14th January, 1881.

SIR,—IN connection with the return furnished by me on the 21st ultimo showing the number of Game Licenses issued in each year since 1873, I think some remarks seem called for in reference to the small number of licenses issued to natives—viz., 3 in eight years—when it is notorious that great slaughter of deer goes on every year on the mainland.

The extent of the destruction may be judged of from the fact that on a single occasion at Point Pedro it was brought to my notice by the sub-collector that in one vessel 3,400 hides had been shipped in September last, which I was informed had been obtained from the Districts of Mullaittivu, Mannár, and Anuradhapura. This would seem to point to a wholesale evasion of the law, though no doubt a large proportion of the deer that are killed are killed in the Udaiyárs division, in which the hunters reside. In this case no license is required.

There seems to be some error in the terms of the resolution which refers to "shooting" licenses, whereas the law requires a license to be taken for killing game in any way, and hunting is in this Province carried on in a great measure by the use of dogs, nets, and cudgels, though battue or driving of game is prohibited by the Game Ordinance.

The resolution would seem to imply that the killing of game in this way involved no breach of the Ordinance.

Making due allowance for game killed in the Udaiyár's division, there must still remain a large quantity killed without license, in breach of the Ordinance, not merely by shooting ; and the detection, and still more the punishment, of this evasion of the law is very difficult Government has to depend on the minor village headmen for information, and they are not disposed to afford it in particular cases, when the evasion of the law is so universal and so profitable to all concerned.

Prosecutions involve long journeys to and from court, and the few cases that have been prosecuted this year have ended in acquittals, mostly on technical grounds.

I am, &c.,
W. C. TWYNAM,
Government Agent.

Enclosure No. 2 in No. 7.

The ASSISTANT GOVERNMENT AGENT, Mannár, to the GOVERNMENT AGENT, Jaffna.

No. 48. Mannár, 25th January, 1881.

SIR,—With reference to your letter No. 32 of the 18th instant and enclosed circular from the Hon. the Colonial Secretary on the subject of the operation of the Game Ordinance of 1872, I have the honour to report as follows:—

I have watched the operation of Ordinance No. 6 of 1872 with great interest from the time of its enactment, both as regards its object of protecting the food supply to some extent of the natives of some Provinces, as also from the point of view of sport. I have endeavoured to enforce its provisions in every District having game in which I have been stationed, and have had good opportunities of watching its operation for a few years past in the Mullaittivu and Mannár Districts of the Northern Province, which abounds with the "game"—deer, at least—whose protection is aimed at by its enactment.

2. After careful observation and reflection I have arrived at the conclusion that, on the whole, deer are at the present moment more plentiful in this District and the Northern Province generally than they were some ten years ago. There are parts of the Province from which the deer were entirely expelled by organized gangs of Moormen before the Ordinance was enacted, to which the deer were afraid for years to venture, but to which they have now returned ; but these Moormen still carry on this destruction in some places with impunity, it being impossible to enforce the provisions of the Ordinance against them. Owing to the density and extent of the Ceylon jungles, it is extremely difficult to arrive at a sure conclusion on this point at any time ; but from what I have seen of the

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game, from observation of them in the two districts named, in their haunts at all seasons of the year, and from what I have gathered about them from the natives themselves, I have come decidedly to the above conclusion.

3. Whether this increase in the deer is due to the operation of the Ordinance or to other causes is, however, another question, and I am inclined to think that it is due to the Ordinance only in a minor degree. There can be no doubt but that deer, in common with all the other animals in the forests here, suffer severely from the conditions of the weather which cause epidemics and decrease of population among the natives themselves, and that in times of drought they die from murrain and want of food and water in considerable numbers, while with a few successive seasons of plentiful rain and consequent abundance of proper food they speedily make up for the previous loss by a corresponding increase in number. The elephant must increase in number (although as a species it is becoming extinct) temporarily, if preserved, as it has increased in Ceylon the last few years, having no enemy but man; deer, on the other hand, although they increase more rapidly, are preyed upon by the larger carnivores as well as by the common enemy—man.

During the year of the Indian famine, 1877 in which cholera and want caused such loss in Ceylon also, I noticed in the Mullaittivu District that while the people were being carried off by cholera in the villages and on the roads, the animals of the forests also were dying in numbers, and I saw that year the carcases of dead elephants, bears (the latter found drowned in village wells), buffaloes, and cattle lying about in the jungles in every direction, while the natives told me that they had seen the carcases of deer, monkeys, and wild pig lying about. (The wild pig die of a murrain caused by eating the dung of cattle suffering from murrain.)

4. But although the game may have increased, I am inclined to think that it is due only in a very small degree to the operation of the Ordinance, which must be pronounced a decided failure as regards checking the killing of the game in the close season in this part of the Island, and failing in that respect must, presumably, fail in its main object—the protection of the food of portions of the rural population; as although some of the flesh of the deer killed in the close season is eaten by the people of the locality where it is killed, by far the most of it is cured and with the hides exported to other Provinces, where it is sold, and of course thus lost as food to the people of the district to whom it belonged as *food*, but not as *money*. The per-centage, besides, of deer annually killed by panthers and leopards must be pretty constant, and so also should be that killed by man, if the natural equilibrium between the different species is to be preserved; whereas if organised and severe slaughter of the deer continues, the deer cannot fail to suffer more than their due share of slaughter, and must, as a source of food for the natives in some districts, diminish sensibly, while the felidæ, finding the deer scarcer than they ought to be, not unnaturally turn their attention to the villagers' cattle, and by their bill for beef take more money out of the district than was realised in it by the illegal slaughter and sale of the game.

5. The close season at present in force in this Province—the six months of the south-west monsoon—is certainly the right one: it is well known that in the tropics deer have no fixed rutting season. I have myself killed does, or seen them killed, at all seasons of the year in different parts of the Island and examined them specially to ascertain whether they had a special breeding season or not, and found them more or less in young at all seasons; the fact of the bucks having their antlers mature and shedding them at all seasons of the year alone proves that they have not.

6. As a rule, the natives do not kill much game during the north-east monsoon in the Northern Province, during which time of the year the deer are not so easily approached, and the natives are, besides, fully occupied with the kalapokam cultivation, but it is during the hot dry months of the south-west monsoon (the close season) when they have no cultivation in particular to attend to, and when the facilities for the destruction of the game are so great, that the slaughter of the innocents is perpetrated.

The chief offenders in this District are Moormen, but in the Vanni Mullaittivu Districts the Tamil villager joins freely in the slaughter. In the dry months of the south-west monsoon, as the drought increases, the game which do not migrate to other districts are restricted in their search for water to a few "villus" and tanks which are well known, and later on (in September), when the drought culminates, are driven even to the dried-up beds of the rivers, where, by scraping up the sand, they can find at the depth of several feet a little water, which, owing probably to the presence of rock beneath, does not in some places sink lower. The midnight congregations of wild beasts and deer at these spots in the dry weather are as miscellaneous as they are wild and amusing to observe. Even the beds of the rivers fail them in very dry seasons, and if in such seasons the N.E. rains are delayed beyond their due time the game suffer great distress for want of water, and sometimes perish.

7. The facilities for the destruction of game in the dry months, when driven by thirst to these few drinking places, may be easily imagined. The Moormen organize the slaughter in regular parties. They proceed to a "villu" or to a tank frequented by deer, and dig ambuscade pits (*"olei"*) in the ground around the last remaining piece of water and make screened platforms with boughs (*sarampa*) in the trees round the tank; two or three men with guns conceal themselves in each of these and shoot mercilessly all the

deer and pig that are driven by thirst to the spot. In the morning they divide the plunder, and sometimes encamp on the ground for days, shooting every night. In a district where they are watched and are afraid of keeping the venison in their houses, they keep it concealed in the jungle, exporting the surplus meat, together with the hides and horns, for sale to Puttalam, Trincomalee, and other places. If the bazaars in such places were strictly watched, these guilty receivers of the meat and hides might be punished and the trade checked to some extent. I have seen over thirty of the ambuscade pits and platforms referred to in a single "villu," and while out shooting bears at night have heard fifteen shots fired at deer in one.

8. It is impossible to bring these offenders to justice under Ordinance No. 6 of 1872. The petty headmen know all about them, but will not inform against them, and though always on the watch to catch these offenders I have succeeded in securing very few convictions against them. Finding the Game Ordinance useless, I now always proceed in a district where the slaughter is carried on under Ordinance No. 19 of 1869, which strikes at the root of the evil, very few guns in the Province being properly licensed, and I have in this way confiscated several dozens of guns in this and the Mullaittívu Districts; but as soon as a lucky seizure of a few (I had the good fortune to seize fifteen unlicensed guns in one village one morning) is effected, the guns in the villages are concealed in every direction on the approach of the Magistrate.

9. One remedy would be the amendment of the Game Ordinance by the addition of a clause empowering the Government to proclaim a District which was found to abuse its privileges by illegal slaughter of the game, and in Districts so proclaimed to make it an offence for natives to carry firearms during the close season (for the purpose of protecting their crops from wild pigs they only want firearms during the other six months); but even if this be done, the natives will be found to conceal their guns as they do at present.

Another and more efficacious remedy would be the exercise of strict supervision over, and where necessary, the complete suspension of the issue of licenses to sell gunpowder, and to have the bazaars constantly examined to prevent illegal sale of gunpowder. Of the two remedies proposed above, I would recommend the latter, as it would dispense with the necessity for alteration in the Ordinance, while being at the same time more efficacious. They may have guns and conceal them if they like, but they cannot use them if they cannot get gunpowder.

I am, &c.,

SAMUEL HAUGHTON,

Assistant Agent and Police Magistrate.

Mannár, 25th January, 1881.

Enclosure No. 3 in No. 7.

The ASSISTANT GOVERNMENT AGENT, Mullaittívu, to the GOVERNMENT AGENT, Jaffna.

No. 42. Mullaittívu Kachchéri, 7th February, 1881.

SIR,—I HAVE the honour to forward herewith my report on the Game Ordinance called for by your letter No. 20 of the 20th ultimo.

The Ordinance has, on the whole, I am inclined to believe, been productive of good, though not quite in the manner or to the extent that was originally intended.

The object of the Ordinance was to protect game in two ways; first, by prohibiting its destruction by non-residents of the District without a license; secondly, by establishing a close season during which no game should be shot. The former of these provisions was, as it seems to me, by far the more important, but it is to the latter that attention has been almost exclusively devoted. It is not quite clear whether the close season was intended to protect deer during the breeding season or during the dry season, when, nearly all the pools having been exhausted, the deer can be easily shot at the few in which water is to be found. In the former case I do not feel at all certain that the present close season is the time during which game breed. In the latter case, the period of protection seems to me to be much too long; such a scarcity of water as would be necessary to render night shooting very destructive never, in my opinion, lasts more than two months, and in many parts of the island never arises at all. It must also be recollected that night shooting can only be carried on when there is a bright moon, and that it will in almost all cases be carried on by residents of the District where the pools are situated. Instead of a total prohibition it would, I think, be better to give the Agent power to prohibit shooting at certain pools during the dry season. This regulation could easily be enforced by clearing the jungle round the pools to a distance of thirty yards.

In this District the flesh of game is the only meat which the native ever sees, and if the present Ordinance were strictly carried out it would deprive all the residents of the District of meat for five months out of seven. It is I think more than questionable whether the supposed abundance of food during seven months compensates the native for being totally deprived of it during five.

In point of fact, however, there is no such abstinence, for only in very rare cases can a villager be got to give information of an offence by which the whole village profits. The only persons who are really prevented from shooting are Europeans, whose movements

GAME ORDINANCE.

PAPERS.

are always well known. I am, therefore, opposed to the close season for the following reasons :—

It is not, and never will be, strictly observed. If not observed, the Ordinance is merely training the native to violate the law. Game can be sufficiently preserved during the dry season without this regulation. Even supposing that it were strictly observed, it is better that the native should have a moderate supply of meat all the year round than that he should have none for five months, and perhaps a superfluity for seven. That there is sufficient game to furnish a moderate supply all the year round, I feel fully convinced.

If, however, it is not considered advisable to abolish the close season, I strongly recommend that the period should be shortened.

If neither of these suggestions are adopted it will be necessary, first, to prohibit the purchase and sale of skins by retail between June and October; and secondly, to empower Agents to issue a monthly license for shooting during the close season. At present, when gentlemen from Europe come out here on a shooting trip, being ignorant of our regulations on the subject, it is, I am afraid, too often the practice to wink at their open violation of the law. I may also point out that a license should be issued for the season. At present it terminates in December, thus compelling men to take out two licenses for one season.

The real reason for the introduction of the Ordinance was not, however, a desire to protect game during the close season, but to prevent bodies of strangers, generally Moormen, from sweeping across a District with large packs of dogs, killing all the game, drying the flesh, and carrying it off for sale. I do not believe that this evil has been in any way checked. The fact is that it is almost impossible to bring these offenders to justice. Being strangers to the District, it would in almost all cases be necessary to arrest them on the spot in order to secure their appearance before the court, but this power of arrest is not given by the Ordinance; and even if it were, it can hardly be expected that villagers in remote places should undertake the risk and responsibility of arresting a body of from five to twenty armed men, who would in all probability never be made answerable for any violence they might commit. On the other hand, if the headmen were to apply to the court for assistance, long before this could be obtained the offenders would have disappeared beyond hope of pursuit. Even suppose that they were arrested while removing the dried flesh of game, this would not be sufficient unless the absolute shooting could be proved. Under these circumstances it is not surprising that the law has hitherto been a dead letter in this respect.

The abuse in question is, I think, to be suppressed by proceeding rather against the receiver than the absolute wrong-doer. If the aim of the Ordinance be to preserve the game in a district for the residents of that district, it is the sale of meat out of the district where the animal was killed that should be stopped. If the residents of the district have the eating of the game killed within it, the residence of the killer is not very material. On the other hand, the residents will not benefit much if one of themselves kills all the game and transports it to other districts for sale. I think, therefore, that the sale of the flesh of game out of the district (*i.e.*, the Kórála's, Vidána Aráchchis', or Udaiyar's district) in which it was killed should either be prohibited, or allowed only under the following restrictions :—

All persons selling the flesh of game killed out of their districts to take out a license similar to a butcher's license, and to keep a record of purchases and sales. Both buyer and seller to be liable in cases of purchases from unlicensed sellers. The flesh of game killed without a license not to be sold out of the district where it was killed, and, if killed without a license, not to be removed from the district without a permit from the Vidané or Arachchi, stating the place where the game was killed, the place to which it is to be removed, the amount to be removed, the number and date of the license under which it was killed. Trespass in pursuit of game without a license in a district of which the trespasser is not a resident, should be an offence. Any person found in possession of over four pounds of game flesh in a district of which he is not a resident should be called on to give a satisfactory account of how he came by the same.

A similar proviso should be made with reference to the possession of fresh deer skins.

Clause 8 of the Ordinance might, I think, with advantage be repealed. It has never seemed to me to bear any definite meaning at all, nor have I ever met anyone who could explain what it meant : it seems to me to be the product of some person whose ideas of sport out here had been gathered in the library rather than the jungle.

I have, &c.,

F. R. ELLIS,

Assistant Government Agent.

XXIV.—1881.

FRENCH MAIL STEAMERS BILL.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bill intituled "An Ordinance to make temporary provision for securing the status of French Mail Steamers within the Ports of this Colony."

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of the Legislative Council, dated 12th October, 1881.

Resolved,—That the following gentlemen be appointed a Sub-Committee to report upon the Bill intituled:

"An Ordinance to make temporary provision for securing the status of French Mail Steamers within the Ports of this Colony."

The Hon. J. DOUGLAS, C.M.G., Colonial Secretary.
The Hon. B. L. BURNSIDE, Queen's Advocate.
The Hon. W. HALLILEY, Acting Principal Collector of Customs.
The Hon. J. VANLANGENBERG, }
The Hon. F. M. MACKWOOD, } Unofficial Members.
The Hon. W. W. MITCHELL, }

FRENCH MAIL STEAMERS BILL.

REPORT.

FRENCH MAIL STEAMERS BILL.

REPORT.

THE Sub-Committee appointed by the Legislative Council to consider the draft of an Ordinance to make temporary provision for securing the status of French Mail steamers within the ports of this Colony have given much attention to this Bill and to the circumstances which have necessitated its introduction.

It appears that the rights and privileges of Men-of-war were conferred upon the subsidized mail steamers of Great Britain and France in each other's ports by the Postal Convention of 1856, passed at a time when no French mail steamers called at English ports, but the port of Marseilles was used as a port of departure for the vessels of the P. and O. Company.

Circumstances have, however, changed since that time, and whereas the vessels of the P. and O. Company no longer call at any French port, those of the Messageries Maritimes call at Aden, Colombo, Galle, Singapore, and Hongkong. The Convention, passed at the outset at the request of Great Britain and for the furtherance of British interests, has therefore for some years past become one in which French interests alone are concerned.

This Convention is binding on the Executive Government; but doubts have it appears arisen, whether it is in consonance with the local law, and the majority of the Sub-Committee do not object to the passing of this Bill for a short and limited period in order to obviate the possibility of a conflict between Executive and Judicial authority in respect of the Convention, pending the result of negociations understood to be now in progress for the re-consideration of its provisions.

But it is upon this ground alone that the majority of the Sub-Committee can recommend the adoption of a measure which renders certain trading vessels lying within British waters havens of refuge where debtors and criminals may set at defiance the decrees of our courts. The Commanders of the steamers of the Messageries Maritimes may no doubt be relied upon to prevent any grave abuse of this right of asylum; but the undersigned cannot but entertain strong objections in principle to conferring such immunities upon merchant vessels, and recommend therefore that the duration of this Ordinance be limited to one year and no longer.

J. DOUGLAS.
B. L. BURNSIDE.
W. HALLILEY.
J. VAN LANGENBERG.

Legislative Council Chamber,
Colombo, 16th November, 1881.

XXV.—1881.

TRANSLATIONS

OF

ANCIENT INSCRIPTIONS

FROM THE

ANURÂDHAPURA AND HAMBANTOṬA DISTRICTS,

NOW

IN THE COLOMBO MUSEUM.

By Dr. E. MÜLLER.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

TRANSLATIONS OF ANCIENT INSCRIPTIONS

FROM THE

ANURÂDHAPURA AND HAMBANTOṬA DISTRICTS, NOW IN THE COLOMBO MUSEUM.

1.—*Ruwanwæli Dâgoba. (Anurâdhapura.)*

"Hail! The great king Gajabâhu Gâmini Abhaya, grandson of king Wahaba, son of king Tissa, having built (or restored) the Dakshina Abhaya and other wihâras, and having protected them, made them inhabited, having strengthened the faith, having made obeisance to the faultless Fina, after having given (the wihâras), he gave to the priesthood the enjoyment of the four pratyayas."

2.—*Tissamahârâma. (Hambantoṭa.)*

"Hail! Buddhadâso, Mahindo, Mahâseno, three brothers, His Majesty King Abhaya, and our uncle the Brâhman Buddhadâso, a venerable reverend thero (these are the persons concerned): King Tettha Tisso, our sire, bought the kiriyas (of land) belonging to the villager Toda; having remitted the taxes, as much as 9,000 kiriyas (about 90,000 acres) (beginning) from Padanagala were given to the reverend, the venerable thero in the great vihâra "King of Mâgama;" and 5,000 kiriyas (beginning) from this Padanagala have been given over, and 4,000 kiriyas shall be .....; the taxes of the 9,000 kiriyas shall be remitted; the rules shall be kept; in the royal family preaching shall be .....; this portion of the kiriyas now is given; four amunas .....; and the remaining portion .....; the lords of the Bhikshu congregation shall be caused to be furnished with the four pratyayas. Having done this (literally, having done—*i. e.*, ordered the keeping of the rules, etc.) in order that what is given to our uncle the Brahman may be kept, causing it to be written on this stone slab, we have it given."

3.—*Lag Vijayasiṇgu Kit. Abhayanæwa.*

"General Lag Vijayasiṇgu Kit, chief minister to Lîlâvati's royal consort, Abha Salamewan, who comes from the royal race of the glorious Ikshvâku family—in the third year (of the king's reign), having made a donation of land: one yala for rice ..... barley to the priests themselves living in the Ruwanpâya (ratnaprâsâda, "palace of jewels") which he himself built on ground from Anurâdhapura for their ease, that it may serve for the four pratyayas, and one yala to the caitya here, and one yala to the image house—the pain in hell, which those shall suffer who obstruct this merit acquired from the offered ..... which shall last as long as sun and moon endure, shall be now and in all future, (but) wise men who, having renounced covetousness, hatred, pride, and not obstructing the merit, do ..... may be pleased to share (the merit).

4.—*Maha Kalattæwa.*

His Majesty Siri Sang Boy, in the 15th year of his reign, on the 10th day in the bright half of navaga, having declared the monastery called by the name of Dapula king of Pâṇḍi, for as long as the birds will build their nests and as the nine planets will exist, and the monastery called after Arak, the chief secretary of Dapula, for so long as the hall will stand, we give it over to the Kolpattri community, and having further declared: according to the rule which the chief secretary Sêna himself has established in the nunnery Nâlârâma, called after the name of his mother, for daily increasing the supply of water at the great vihâra and at the great Bô tree, and for furnishing daily the four pratyayas to seven persons, nuns and novices, a privilege is hereby given to the village Gitelgamu that the trokarmasthânas shall not ..... , that travellers and pilgrims shall not enter, that the officers of the royal family shall not enter the assembly of the priests, that enemies shall not take cattle from the village, that the cart buffaloes shall not enter. The king having thus declared for so long as the birds will build their nests and the nine planets will exist and the hall will stand, for so long we give it to the Kalpattra community, the privilege was given to the village Gitelgamu.

5.—*Dondra No.* I.

In the year 1432 of the auspicious, revered and correct Saka in the fourth year of the auspicious Lord of Ceylon, the fortunate Siri Sangbosri Wijaya Bâhu, born in the family of the sun, descended from the line of the royal, auspicious, and fortunate Maha

ANCIENT INSCRIPTIONS.

ANURÂDHAPURA AND HAMBANTOTA DISTRICTS.

Sammata, in the fifth day of the dark half of the month Poson, granting to the Nagarisa Nila (Vishnu) temple in Dondra twenty amunas' sowing extent of the fields in Nawadunne and Pâtegama, and the produce of Batgama, where the Atupatto A'rachchi made the dam, having granted (all this) so that it should remain for ever in the same manner as the places bought for money and now included in Parawâsara, were offered to the god. Let all kings and chiefs and other ministers and chief priests and priests and .....

6.—*Dondra No.* II.

In the tenth year of the overlord Siri Sangha Bodi, Sri Parâkrama Bâhu, a cocoanut tope, bought for money (near) to the Bhûmi Mahâ wihâra, to the image house: and 200 cocoanut trees to the lord Dêwa Râjâ (Vishnu). Let those who increase these gifts, and uphold their inheritance, enjoy the bliss of release. Those who enjoy the fruit of these trees ought, from time to time, to plant seedlings. People who pick up fruits ought to present to Nila (Vishnu).

7.—*Mayilagastota.*

The âepâ Mahinda, who was born in the womb of the anointed queen Gon, chief queen to his majesty the king, descended from the unbroken line of the Ikshvâku family reigning an Laṅka's ground by hereditary succession—the son of King Abhâ Salamewan—the pinnacle of the kshatriya caste, the sage who has comprehended the doctrine—having made the necessary repairings at the Mahâ vihâra, caused priests to be ordained for the nikâyas at the Uda Tissa monastery and ..... ordered that the officers of the royal family shall not enter the place belonging to the priesthood, that enemies shall not take away the villages, the cattle, the royal taxes, the revenue, the cart buffaloes; that daily the priests, including the high priest, shall not destroy .....; that the officers of the royal family .....

8.—*Kongollewa.*

His Majesty Siri Sang Bo, in the twelfth year of his reign, on the eighth day of the bright half of Durutu (January—February) declared that in this monastery ..... shall not enter; that the chief secretary .....; that travellers and pilgrims shall not enter. The king thus having declared, it was given over as a privilege ..... The king Siri Sanga Boy was pleased to sit under this mandhûka tree on the full moon day of January.

9.—*Government Agent's House, Anurâdhapura.*

The laymen shall present to the priests two hanas (?) of gold, one adinana of rice as offering, one hana (?) and two akas of flowers ..... and for those who are sick ten hanas (?) of rice .....

10.—*Abhagawewa.*

His Majesty Siri Sang Boy, in the 19th year of his reign on the 15th day in the bright half of Mædindina (March—April) having constructed the large tank called Abhayawawa, ordered to put at the four corners of this tank four pillars, that whoever might kill fishes in this tank should be taken into custody, not to be concealed but to be taken to the town and should be fined 10 ..... of gold by the overseer of the Mahâ vihâra, and if unable to pay the fine he should be made to work at the tank. It is a sin to kill fishes in this tank, and the fishermen should be taken into custody.

11.—*Kalgatta.*

..... after having overcome all blame and disrespect in the kingdoms of Mâya and Pihiti ..... he contented himself with rice and betel and was not proud; he protected those who were satisfied with their portion from all fear concerning their property and from all evil .....; and saying "They will be pleased by my coming," he went twice over to the kingdom of Pâṇḍi and raised the balance. The king of Pâṇḍi ..... having taken the queen's horses and elephants from the government of the Solî kingdom, he went back to Ceylon, made happy the three kingdoms, saw Adam's Peak and the other strongholds. He who did all this, his Majesty the overlord Kâlinga Niccanka, was pleased to erect (this pillar).

XXVI.—1881.

GOVERNMENT CIVIL HOSPITALS AT OUTSTATIONS.

RETURN to an Order of the LEGISLATIVE COUNCIL of CEYLON, dated the 16th November, 1881:

"That a Return be furnished of all Government Civil Hospitals in the Island outside the Provincial Capitals, and the cost of maintaining the same, and a list of Public Officers in charge."

(The Hon. J. L. Shand.)

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

CIVIL HOSPITALS AT OUTSTATIONS.

RETURN to an Order of Council dated November 16, 1881: "That a Return be furnished of all Government Civil Hospitals in the Island, outside the Provincial Capitals, with the cost of maintaining the same, and a list of the Public Officers in charge."

Town.	Cost, excluding Staff given in next column, for 1880.		Staff and Annual Cost when not given under preceding column (for 1880)
	Rs.	cts.	
Western Province.			
Pánaduré	3,303	64	One Sub-Assistant Colonial Surgeon, Rs. 1,100 ; one Dispenser.
Kalutara	4,361	55	One Deputy-Assistant Colonial Surgeon, Rs. 1,500 ; one Dispenser.
Kégalla	4 432	89	One Sub-Assistant Colonial Surgeon, Rs. 1,100 ; one Dispenser.
Ratnapura	6,123	19	One Deputy-Assistant Colonial Surgeon, Rs. 1,500 ; one Dispenser
Negombo	7,641	8	One Assistant Colonial Surgeon, Rs. 3,000 ; one Dispenser.
North-Western Province.			
Puttalam	6,619	72	One Assistant Colonial Surgeon, Rs 3,000 ; one Dispenser.
Chilaw	1,883	69	One Sub-Assistant Colonial Surgeon, Rs 1,000.
Southern Province.			
Matara	6,129	84	One Assistant Colonial Surgeon, Rs. 3,000 ; one Dispenser
Hambantota	2,497	86	One Deputy-Assistant Colonial Surgeon, Rs. 1,500 ; one Dispenser.
Tangalla	1,639	94	One Sub-Assistant Colonial Surgeon, Rs. 1,100 ; one Dispenser.
Eastern Province.			
Trincomalee	3,867	70	One Assistant Colonial Surgeon, Rs. 2,250 ; one Dispenser.
Northern Province.			
Mullaittívu ...	4,211	17	One Assistant Colonial Surgeon, Rs. 2,000
Vavúniya-Viláṇkulam ..	3,473	55	One Medical Practitioner, Rs. 1,000.
Point Pedro	2,249	12	One Medical Practitioner, Rs. 900 ; one Dispenser.
Central Province.			
Gampola	9,275	12	One Deputy-Assistant Colonial Surgeon, Rs. 1,500 ; one Dispenser.
Badulla	9,566	90	One Assistant Colonial Surgeon, Rs. 3,500 ; one Dispenser
Mátale	7,221	78	One Assistant Colonial Surgeon, Rs. 3,000 ; one Dispenser.
Nuwara Eliya	8,105	8	One Assistant Colonial Surgeon, Rs. 3,500 ; one Dispenser.

NOTE.—This return excludes Pioneer, Immigrant, Prison and Police Hospitals.

XXVII.—1881.

FURTHER PAPERS

ON THE SUBJECT OF

ECCLESIASTICAL SUBSIDIES.

(In continuation of Sessional Paper No. XIV. of 1881.*)*

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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FURTHER PAPERS

ON THE SUBJECT OF

ECCLESIASTICAL SUBSIDIES.

No. 1.

Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G., to the Right Hon. the EARL OF KIMBERLEY.

No. 233.—*Miscellaneous.*

Queen's House, Colombo, Ceylon, 25th August, 1881.

MY LORD,—AT the request of the Presbytery of the Scotch Presbyterian Church of Ceylon, I have the honour to transmit a memorial addressed by them to your Lordship, praying that the commencement of the term of five years of grace conceded by your Lordship's despatch No. 174 of 19th November, 1880, for the cessation of Government subsidies to the various churches, may begin from the date of the passing of the Act which will be introduced into the Legislative Council for that purpose.

2. I am not prepared to support to this extent the prayer of the memorialists. The term of grace allowed is liberal, and it is by no means certain that the necessary details can be arranged for passing a Disestablishment Ordinance during the coming session of Council. The only ground upon which, as it appears to me, any semblance of grievance can be set up is, that whereas it was generally supposed from the tenour of your despatch No. 174 of the 19th November, 1880, that formal notice of the inception of the term of grace would be announced beforehand, your Lordship's despatch No. 85 of 16th March last antidated that term to 1st January last, and I am aware that this is considered a hardship by the churches interested.

3. Any such feeling would be removed should your Lordship see fit to postpone the inception of the term of grace till July 1st, two months after the decision contained in the last-mentioned despatch was communicated to the parties interested.

I am, &c.,
JOHN DOUGLAS.

Enclosure in No. 1.

To the Right Hon. the EARL OF KIMBERLEY, Her Majesty's Secretary of State for the Colonies.

The Memorial of the Presbytery of Ceylon.

HUMBLY SHOWETH,—That your memorialists were informed by your Lordship's despatch of 19th November last that a term of five years' grace would be given to churches in which to arrange for the cessation of all Government subsidies. They desire to call your Lordship's attention to the fact that the effect of beginning the operation of that period from January, 1881, is to abridge the five years by a year or more.

Until an Ordinance is passed by the Ceylon Government, the future constitution of the church or churches cannot be prepared, and effective steps cannot be taken in establishing a fund for the future maintenance of ministers until the changes required under this new constitution be arranged and promulgated.

Your memorialists therefore pray that your Lordship will not allow the proposed five years of grace to be shortened, but will begin them from the date of the passing of the Act, as in the original proposal.

And your memorialists will ever pray.

For the Presbytery of Ceylon.
JO. BURNET.

HENRY L. MITCHELL,
Presbytery Clerk.

ECCLESIASTICAL SUBSIDIES.

FURTHER PAPERS.

No. 2.

The Right Hon. the EARL OF KIMBERLEY to Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G.

Ceylon.—No. 323.

Downing-street,
11th October, 1881.

SIR,—I HAVE had under my consideration your despatch No. 233 of the 25th of August, forwarding a memorial from the Presbytery of the Scotch Presbyterian Church of Ceylon, praying for a postponement of the date from which the term of five years of grace allowed for the cessation of ecclesiastical subsidies in Ceylon should commence.

2. Although the term of five years of grace conceded to the Church bodies affected was a fair and liberal concession, yet, in consideration of the fact that my final decision was not communicated to them till some time after the date fixed, and that as you inform me there was a general impression that such notice would have been announced beforehand, I am willing to consent that the period of five years should commence from the 1st of July last, before which date my decision had been made fully known to all concerned.

I have, &c.,
KIMBERLEY.

XXVIII.—1881.

SUPPLY BILL, 1882.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bill intituled "An Ordinance for making provision for the Contingent Services for the year 1882."

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of the Legislative Council, dated 19th October, 1881.

Resolved,—That the following gentlemen be appointed a Sub-Committee to report upon the Bill intituled:

"An Ordinance for making provision for the Contingent Services for the year 1882."

The Hon. J. DOUGLAS, C.M.G., Colonial Secretary.
The Hon. W. H. RAVENSCROFT, Auditor-General.
The Hon. J. STODDART, Acting Surveyor-General.
The Hon. J. VANLANGENBERG,
The Hon. W. W. MITCHELL,
The Hon. J. L. SHAND,
} Unofficial Members.

SUPPLY BILL, 1882.

REPORT.

THE Sub-Committee of the Legislative Council appointed to consider the Ordinance for making provision for the Contingent Services of the year 1882 have the honour to report:—

No. 1.—ESTABLISHMENTS.

I.—CIVIL.

SECRETARIAT.

The number of Writers in this Department has been reduced from 15 to 12, which will effect a saving of Rs. 9,000, and a proportionate reduction of Rs. 1,000 in the Pandit allowance to Writers.

Printing Department.

The special allowance of Rs. 1,000 which was made to Mr. Herbert in consideration of his long and valuable services ceased on his retirement from the Department.

TREASURY.

It has hitherto been customary to charge the cost of the stationery supplied to the various Departments in one sum to the Colonial Store Department, and to issue the stationery free of cost In future it is proposed, as being likely to be productive of economy, to charge each Department with the cost of its stationery. The sum which used to be voted to the Colonial Store is therefore distributed *pro rata* among the several Departments.

PROVINCIAL AGENCIES.

WESTERN PROVINCE.

The working of the new Grain Tax Ordinance has required the employment of two extra clerks at a cost of Rs. 2,000. The Sub-Committee have been glad to learn that the work of commutation will be completed throughout the Province this year, and that the system is appreciated.

SOUTHERN PROVINCE.

The Sub-Committee recommend the appointment in this Province of a special officer to perform the duties of Forester, which have hitherto been carried on by the Superintendents of Minor Roads. This will increase the cost of establishment by Rs. 1,000, which sum is, however, almost counterbalanced by savings under "Services, exclusive of Establishments."

NORTHERN PROVINCE.

The Assistant Agency at Mullaittívu has been abolished, and the staff of this Kachchéri has been incorporated with that of Vavúniya-Vilánkulam, whereby a saving in the administration of the Province of Rs. 6,250 will be effected.

CENTRAL PROVINCE.

An increase of nearly Rs. 1,000 in the cost of the establishment of this Province is accounted for by the periodical increments to jailers' salaries.

PUBLIC WORKS DEPARTMENT.

The Committee have learned from the Director of Public Works that the number of Superintending Officers employed in his Department may, owing to the reduction in the amount of work which it has to undertake, be reduced by two; this will effect a saving of Rs. 6,000 in the amount provided in the estimates.

As there are no new works of importance to be designed at present, and the Sub-Committee are assured by the Director that he has officers in his Department capable of preparing any designs which may be required, it is recommended that the office of Architect be dispensed with. The vote which has been previously allowed for "extra clerks occasionally employed" should also be discontinued.

SUPPLY BILL, 1882

REPORT.

SURVEY DEPARTMENT.

The number of Meteorological Observers has been increased from twelve to thirteen owing to the establishment of an observing station at Vavúṇiya-Viláṇkulam, at a cost of Rs. 120.

CUSTOMS DEPARTMENT.

The establishment of a Customs port at the Batticaloa Bar has caused an increase of Rs. 700 in the vote required for this establishment.

POST OFFICE.

An increase of Rs. 2,176 is attributable to the extension of the Money Order system, the amalgamation of the Postal and Telegraphic Departments, and the annual increment to certain officers' salaries.

TELEGRAPH BRANCH.

The detailed cost of working this branch—namely, Rs. 72,036—appears for the first time as an Establishment charge, it having been transferred from "Services, exclusive of Establishments," under which it is provided in a lump sum for the current year.

BOTANIC GARDENS.

As the work of the Cryptogamist has now been completed, and his services will terminate on the expiry of his engagement, a saving of Rs. 3,000 will be effected.

There is a slight increase in "Contingencies" of Rs. 150.

COLOMBO MUSEUM.

A reduction of expenditure under this heading is due to the cessation of the Archæologist's employment on the completion of his labours.

II.—JUDICIAL.

QUEEN'S ADVOCATE.

A clerkship was attached to this Department seven years ago, with a salary of Rs 2,000, for the purpose of auditing the testamentary accounts of the District Courts. It has not been found possible to carry out this intention, and the clerk having now been transferred to another station a saving of Rs. 1,000 has been effected in the salary of the post.

DISTRICT COURTS, COURTS OF REQUESTS, AND POLICE COURTS.

Various important changes in the contingent votes for these Courts do not require special reference, and an appointment having been now found in the Service for the Itinerating District Judge, the salary previously voted for this office ceases: the result is a total reduction of Rs. 5,355 in the charges for Court establishments.

IV.—PUBLIC INSTRUCTION AND EDUCATION.

The total vote for educational purposes is almost similar to that of the current year, an increase of Rs. 8,000 under "Establishments" being balanced by a proportionate reduction under "Services, exclusive of Establishments."

V.—MEDICAL, HOSPITALS, AND SANITATION.

The vote required for the above services is less by Rs. 7,889 than the estimate for the current year for the working of these Departments under the two headings under which votes are taken for them.

VI.—POLICE AND POLICE SERVICES.

The slight reduction in this vote would have been greater but for the increase of crime in the Eastern Province, which necessitated the appointment of an Inspector of Police at Batticaloa. The additions to the force required for guarding the Kalutara river have also caused additional expenditure.

VIII.—COLONIAL STORES.

The want of sufficient check upon the landing of Colonial Stores has been so much felt that the appointment of a landing supervisor is recommended as an experiment, increasing the estimated cost of the establishment by Rs. 1,500 per annum.

IX.—CEYLON GOVERNMENT RAILWAY.

The decrease in traffic on the railway lines has been accompanied by a decrease in the working expenses, amounting to an estimated reduction of Rs. 16,840 in the Resident Engineer's Department, and of Rs. 23,790 in that of the Finance and Traffic Manager.

SERVICES, EXCLUSIVE OF ESTABLISHMENTS.

No. 3.—REVENUE SERVICES.

PEARL FISHERY.

There will be no Pearl Fishery during the coming year; the operations under this heading will therefore be limited to the usual inspection of Pearl Banks.

BOTANIC GARDENS.

It is recommended that the vote for Botanic Gardens be increased by Rs. 1,500, with the two-fold object of completing the economic garden at Pérádeniya, and of making these institutions of more general practical value.

No. 4.—ADMINISTRATION OF JUSTICE.

The expenditure attendant upon the Administration of Justice has been so much increased by batta and travelling allowances to jurors and witnesses and the several circuit expenses of the Supreme Court, that an increase of this vote is rendered necessary, amounting to Rs. 23,790.

No 9.—PRISON SERVICES

The vote for the maintenance of the Convict Establishment and of the prisons throughout the North-Western, Southern, Northern, and North-Central Provinces has to be considerably augmented, owing to the large increase in the number of prisoners.

No. 11.—TRANSPORT

A saving of Rs. 5,240 will be caused by there being no occasion to take a vote for the travelling expenses of the Cryptogamist, and by a reduction in the vote for passage money to public officers.

No 12.—CONVEYANCE OF MAILS AND POSTAL SERVICES

The amount asked for sea conveyance of mails is Rs. 13,000 less than during the current year, and with the exception of the item stationery (Rs. 5,550), now charged to the Post Office, the estimate remains nearly the same.

No. 13—WORKS AND BUILDINGS.

A vote of Rs. 10,000 is asked for towards the completion of the Lunatic Asylum.

The erection of a passenger landing jetty at Colombo is an urgent want, the present jetty being past repair. A vote of Rs. 8,950 is required for this purpose.

The Committee also learn that the Leyden Bastion jetty is in the same condition, and that a new jetty will be required at this spot at an estimated cost of Rs. 8,000.

The usual annual vote for the improvement of Galle Harbour is reduced by half—viz., to Rs. 5,000.

The only new roads for which grants are asked are from Tebuwana to Nebada, Kalutara District, Rs. 6,700; Kalupahana road (balance of estimate), Rs. 11,700; and the extension of the grant-in-aid Uḍa Pusselláwa road (Government moiety), Rs. 30,000.

No. 14.—ROADS, STREETS, BRIDGES, AND CANALS.

The estimate for expenditure under this heading has been reduced since the Estimates were laid before Council by about Rs. 20,000, the saving will be chiefly effected in the Western and Central Provinces. In the latter Province the Holyrood and Carolina roads are new items in the estimates.

As a necessary relief to the Kandy Municipality, it is proposed also to take over the roads from the Queen's Hotel to Katugastota and from Pérádeniya to Lewella.

The Sub-Committee regret they have to record a reduction of the Irrigation vote from Rs. 60,000 to Rs. 20,000. They trust that this will not involve undue disappointment to villagers who have undertaken the repair of their tanks in anticipation of sluices being supplied to them.

No. 15. MISCELLANEOUS SERVICES.

Though the duties of Forester have been energetically performed by the various officers employed in the different Provinces, none of them have had any previous scientific training. It is proposed therefore to vote the sum of Rs. 6,000 to obtain for a short period the services of a skilled Forester from India, who will visit the various districts, and from whom it is hoped that much valuable information will be obtained.

As the Amended Medical Aid Ordinance will not come into operation till 1st January, 1883, it is necessary to provide Rs. 6,000 for the collection of assessment under the present system.

SUPPLY BILL, 1882.

REPORT.

No. 16.—INTEREST.

Interest on the Breakwater loan will next year increase from Rs. 180,020 to Rs. 207,000.

No. 17.—COLONIAL STORE.

As previously mentioned, stationery has been charged to the several Departments instead of, as hitherto, in a lump sum under this heading.

No. 18.—CONTRIBUTION TOWARDS MILITARY EXPENDITURE.

The Council is this year asked to vote Rs. 32,000 towards the maintenance of the Volunteer Regiment which has been enrolled under the Ordinance No. 3 of 1861, and the Sub-Committee have much pleasure in recording their concurrence in the measures which have been so successfully initiated for the establishment of this Corps.

No. 23.—RAILWAY SERVICES.

The main line is now practically free; no provision has therefore to be made in this Bill for sinking fund.

No. 24.—TELEGRAPH SERVICES.

The vote under this heading is for the balance due to the Indian Government for loss sustained by working the Ceylon telegraphs.

J. DOUGLAS.
W. H. RAVENSCROFT.
J. STODDART.
J. VAN LANGENBERG.
W. W. MITCHELL.
J. L. SHAND.

Legislative Council Chamber,
Colombo, 23rd November, 1881.

APPENDIX.

A.

ADDITIONAL Items to be inserted, increased, reduced, or omitted from the Supply Estimates, 1882.

	To be inserted.		To be increased.		To be reduced.		To be omitted.	
	Rs.	cts.	Rs.	cts.	Rs.	cts.	Rs.	cts.
SECRETARIAT.								
Contingencies.								
Pandit allowance to Writers	—		—		250	0	—	
PROVINCIAL AGENCIES.								
WESTERN PROVINCE.								
Kalutara Prison.								
Jailer	—		80	0	—		—	
SOUTHERN PROVINCE.								
HAMBANTOTA.								
Tangalla.								
Jailer	—		—		40	0	—	
CENTRAL PROVINCE.								
Matale.								
Shroff	800	0	—		—		—	
PUBLIC WORKS DEPARTMENT.								
Salaries.								
2 Superintending Officers at Rs 3,000 ...	—		—		6,000	0	—	
CUSTOMS DEPARTMENT.								
WESTERN AND NORTH-WESTERN PROVINCES.								
Contingencies.								
Stationery	616	0	—		—		—	
SOUTHERN PROVINCE.								
Contingencies.								
Stationery	178	0	—		—		—	
EASTERN PROVINCE								
Contingencies.								
Stationery	85	0	—		—		—	
NORTHERN PROVINCE.								
Contingencies.								
Stationery	291	0	—		—		—	
HARBOUR DEPARTMENT								
MASTER ATTENDANT, COLOMBO.								
Salaries.								
Coxswain and crew (6) of rowing boat ...	1,320	0	—		—		—	
TELEGRAPH BRANCH.								
POSTMASTER-GENERAL.								
Salaries.								
Direction and Superintendence : 1 Assistant Superintendent ...	—		375	0	—		—	
BOTANIC GARDEN.								
Contingencies.								
Descriptive labels, cabinets, books, and articles required for the herbarium and library, including carriage and freight of plants and specimens	—		1,100	0	—		—	
MEDICAL.								
Salaries.								
Dispenser	—		75	0	—		—	
Medical officer in charge of the hospital at Marawila	900	0	—		—		—	
COLONIAL STORE.								
Landing Supervisor	—		52	22	—		—	
REVENUE SERVICES.								
BOTANIC GARDEN.								
Director.								
Coolies at rates not exceeding 37½ cents a day —total not to exceed	—		1,500	0	—		—	

REVENUE SERVICES—*continued.*	To be inserted.	To be increased.	To be reduced.	To be omitted
PRINCIPAL COLLECTOR OF CUSTOMS.	Rs. cts.	Rs. cts.	Rs. cts.	Rs. cts
Stationery	—	—	—	990 0
EDUCATION (EXCLUSIVE OF ESTABLISHMENTS) AND DONATIONS TO LIBRARIES, BOOK CLUBS, READING ROOMS, &c.				
DIRECTOR OF PUBLIC INSTRUCTION.				
Allowances.				
Rent, Kandy Industrial School ...	500 0	—	—	—
RENT.				
Rent of School houses	—	—	500 0	—
TRANSPORT.				
Agent, Central Province.				
Conveying and guarding Treasure ..	—	200 0	—	—
ROADS, STREETS, BRIDGES, & CANALS.				
MAINTENANCE OF ROADS.				
Western Province.				
Fort to Wellawatta	—	—	150 0	—
Wellawatta to Bentota	—	—	537 50	—
Fort to Grandpass	—	—	150 0	—
Grandpass to Toppu	—	—	300 0	—
Roads in Negombo	—	—	130 0	—
Grandpass to Kadugannawa	—	—	500 0	—
Grandpass to Avisawella	—	—	300 0	—
Avisawella to Ratnapura	—	—	300 0	—
Ratnapura to Pelmadulla	—	—	316 50	—
Pelmadulla to Gurukandura	—	—	720 0	—
Negombo to Giriulla	—	—	250 0	—
Veyangoda and Ja-ela roads	—	—	187 50	—
Welisara to Ragama	—	—	112 0	—
Dolosbage to Rambukkana	—	—	400 0	—
Kegalla to Polgahawela	—	—	140 0	—
Avisawella towards Ginigathena to boundary of Province	—	—	180 0	—
Ruanwella to Bulatkohopitiya ...	—	—	50 0	—
Hanwella to Bope	—	—	50 0	—
Nambapana road	—	—	28 0	—
River side road, Ratnapura	—	—	20 0	—
Kukulu-korale Tavalam road	—	—	20 0	—
Kelani to Biyagama	—	—	150 0	—
Urugodawatta road	—	—	112 50	—
Kotte road	—	—	193 75	—
Borella to Customs Wharf	—	—	94 50	—
Town Hall to Mattakuli	—	—	75 0	—
Approach road to offices of the Department of Public Works, Surveyor-General, and Registrar-General	—	—	50 0	—
Roads within the Customs premises ...	—	—	300 0	—
North-Western Province.				
Polgahawela to Galagedara	—	—	316 0	—
Kurunegala to Nikaweratiya	—	—	208 0	—
Nikaweratiya to Puttalam	—	—	312 0	—
Puttalam to North salt pans and Tilliady ...	—	—	212 0	—
Kurunegala to Beligamuwa	—	—	212 0	—
Puttalam to Kala-oya .. .	—	—	420 0	—
Maturankuli to Toppu	—	—	832 0	—
Kurunegala to Giriulla	—	—	208 0	—
Padeniya to Siyambalagama	—	—	208 0	—
Narammulla to Madampe	—	—	216 0	—
Southern Province.				
Bentota to Goyyapana ...	—	—	916 0	—
Roads within the Municipality of Galle ..	—	—	75 0	—
Goyyapana to Kemagoda	—	—	826 0	—
Kemagoda to Hambantota	—	—	776 0	—
Lewaya road from Hambantota to Bundala . .	—	—	173 0	—
Galle to Kananke	—	—	125 0	—
Kananke to Wiharahena	—	—	723 50	—
Dodanduwa to Baddegama	—	—	75 0	—
Matara to Hakmana	—	307 50		
Hambantota to Tanamalwila	—	—	93 75	—
Eastern Province.				
Trincomalee to Kittulutta	—	—	469 50	—
Coast road, Batticaloa District...	—	—	939 0	—
Trincomalee towards Anuradhapura ...	—	—	469 50	—
Maduru-oya to Eravur, Badulla	—	—	782 50	—
Northern Province.				
Gravets of Jaffna	—	—	120 0	—
Semmani road	—	—	20 0	—

	To be inserted	To be increased.	To be reduced.	To be omitted.
	Rs. cts.	Rs. cts	Rs. cts.	Rs. cts.
Northern Province—continued.				
Jaffna to Karativu	—	—	40 0	—
Punnalai road	—	—	40 0	—
Jaffna to Kankesanturai	—	—	70 0	—
Point Pedro to Punnalai	—	—	60 0	—
Jaffna and Point Pedro road	—	—	60 0	—
Point Pedro to Kodikamam	—	—	200 0	—
Puttur to Kodikamam	—	—	100 0	—
Manippe to Kaitadi	—	—	40 0	—
Vallai to Valluvedditurai	—	—	20 0	—
Vallukkaiyaru to Kayts	—	—	20 0	—
Jaffna and Kaitadi (1st section Central road)	—	—	20 0	—
Kaitadi and Elephant Pass (2nd road) ...	—	—	240 0	—
Elephant Pass to Panichankulam (3rd road)...	—	—	320 0	—
Panichankulam to Galkandamadu (4th road)	—	—	375 0	—
Mullaittivu to Central road (old trace) ...	—	—	135 0	—
Coast road to Colombo	—	—	180 0	—
Yakwewa to Pesalai	—	—	4,100 0	—
Central Province.				
Kadugannawa to Peradeniya	—	—	100 0	—
Peradeniya to Gampola	—	—	108 0	—
Katugastota to Balakaduwa	—	—	108 0	—
Balakaduwa to Matale	—	—	126 0	—
Matale to Dambulla	—	—	126 0	—
Madulkelle to Bambera-ella . ..	—	—	19 50	—
Kandy to Haragama ...	—	—	273 0	—
Haragama to Kurundu-oya	—	—	273 0	—
Dotale road (Government moiety) ...	—	—	62 50	—
Pupuressa road (Government moiety) ...	—	—	236 0	—
Gampola to Ginigathena	—	—	340 0	—
Ginigathena towards Kitulgala to boundary of Province	—	—	213 0	—
Dolosbage road, 2nd section (Government moiety)	—	—	9 25	—
Katugastota to Galagedara	—	—	126 0	—
Iriyagama to Alladeniya	—	—	68 0	—
Dimbula road, Nawalapitiya to Tispane ..	—	—	234 0	—
Tispane to Lindula	—	—	550 0	—
Lindula to Nuwara Eliya	—	—	200 0	—
Walaha road (Government moiety) ...	—	—	7 50	—
Bathford Valley road (Government moiety ...	—	—	11 25	—
Railway Gorge road (Government moiety) ...	—	—	46 0	—
Dimbula, Dikoya Junction	—	—	20 0	—
Wanarajah road (Government moiety) ...	—	—	7 75	—
Nuwara Eliya bazaar road	—	—	20 0	—
Uda Pussellawa road	—	—	40 0	—
Dikwella to Naula	—	—	98 0	—
Naula to Gurukandura	—	—	1,155 25	—
Naula to Tanamalwila	—	—	180 0	—
Dikwella to Madulla	—	—	28 0	—
Badulla to Taldena	—	—	45 50	—
Holyrood road	—	60 0	—	—
For Clerks and Storekeepers	—	34 0	—	—
North-Central Province				
Migaswewa to Kitulutta	—	—	675 0	—
Mirisgoni-oya to Galkandamadu ...	—	—	1,300 0	—
Kala-oya to Galgodahena	—	—	1,200 0	—
Anurádhapura to Siambalagama ...	—	—	125 0	—
Galkulam through Mihintale to Rambewa ...	—	—	125 0	—
Madawachchi to Yakwewa	—	—	125 0	—
For Clerks and Storekeepers	—	215 0	—	—
NEW BRIDGES.				
Northern Province.				
For completing the Elephant Pass Causeway	1,500 0	—	—	—
INLAND NAVIGATION, MAINTENANCE.				
Western Province.				
Colombo to Kammal	—	—	225 0	—
Colombo to Kalutara	—	—	185 0	—
Kilapane canal	—	—	37 50	—
North-Western Province.				
Toppu to Puttalam	—	—	632 0	—
Northern Province.				
Boat channel, Jaffna lake	—	—	60 0	..
MISCELLANEOUS SERVICES.				
TREASURER.				
Expenses of Indian Forest officer on temporary duty	6,000 0	—	—	—

SUPPLY BILL. 1882.

APPENDIX.

	To be inserted.	To be increased.	To be reduced.	To be omitted.
	Rs. cts.	Rs. cts.	Rs. cts.	Rs. cts.
MISCELLANEOUS SERVICES—*continued.*				
PROVINCIAL AGENCIES.				
Agent, Central Province.				
Commission to the Manager of the Oriental Bank at Kandy on drafts drawn in favour of the Assistant Agent at Badulla and Nuwara Eliya... .. .	—	—	2,000 0	—
Collection of Medical Aid Assessment ...	6,000 0	—	—	—

B.

LIST of Unexpended Balances to be brought forward for expenditure in 1882.

Estimate No.	Date of sanction.	Service.			Remarks.
			Rs. cts	Rs cts.	
		Supply Bill, 1877.			
		For Telegraph line from Polgahawela to Kurunegala ...	11,745 0	11,745 0	Brought forward since 1877
	1881.	*Supply Bill*, 1879.			
538	May 25	For building a new market at Nupe, Matara ..	1,440 0	1,440 0	Probable date of completion, March, 1882.
	1880	*Supply Bill*, 1880.			
698	July 6	For altering the Kalutara Rest house into a Police Court ...	1,071 0	—	No expenditure can be incurred till the new Rest-house is built
756	August 30	For the erection of an anicut across the Kurinde-ganga ...	3,000 0	4,071 0	—
	1881.	*Supply Bill*, 1881			
15	August 26	For the construction of a bridle path from Haldummulla to Horton Plains ...	4,000 0	—	—
540	May 25	For the construction of a sluice at Meddebeddewewa village tank in Bintenna Palata, Arulapitiya-korale ..	500 0	—	—
687	Sept 27	For repairs to Signal Flagstaff, Galle	555 0	—	Required to meet Crown Agents' charges for materials ordered out from England.
597	July 11	For opening a watercourse from the Taldena anicut to the fields at Taldena	3,700 0	— 8,755 0	Do. do.
			Rs. ...	26,011 0	

Public Works Department,
Colombo, 14th November, 1881.

A. MURRAY,
for Director of Public Works.

XXIX.—1881.

CINCHONA CULTIVATION.

PROCEEDINGS OF THE MADRAS GOVERNMENT

EMBODYING

REPORT BY COLONEL BEDDOME ON HIS RECENT VISIT TO THE ISLAND.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

CINCHONA CULTIVATION.

LETTER from the SECRETARY to the Government of Madras, Revenue Department, to the Hon. the COLONIAL SECRETARY, Colombo.

No. 169.—*Miscellaneous.*

Revenue Department,
Ootacamund, 12th October, 1881.

SIR,—ADVERTING to the correspondence marginally noted, I am directed by the Hon. the Governor in Council to forward, for the information of His Excellency the Governor of Ceylon, copy of the Proceedings of this Government under date the 12th October, 1881, No. 1,513, embodying a report by Colonel Beddome on his visit to the Cinchona plantations in the Island; and to request that you will be so good as to order the despatch to Madras, on account of this Government, of 100 copies of Mr. Owen's Cinchona Manual referred to in the Conservator's concluding paragraph.

2. I am further to request that the thanks of this Government may be conveyed to Dr. Trimen for the assistance given to Colonel Beddome in the prosecution of his enquiries.

I have, &c.,
C. G. MASTER,
Secretary to Government.

GOVERNMENT OF MADRAS.—REVENUE DEPARTMENT.

12th October, 1881, *No.* 1,513.

READ THE FOLLOWING PAPER:—

No. 167. From Colonel R. H. BEDDOME, Conservator of Forests, to the SECRETARY to Government, Revenue Department, dated Ootacamund, 3rd October, 1881, No. 619:—

I HAVE the honour to inform you that I have lately paid a short visit to Ceylon in connection with Cinchona.

2. *Route pursued.*—I was only able to spare a fortnight, so that my visit was rather hurried: but I was able to see a good many estates at different elevations and with different soils. I also obtained much information from Dr. Trimen, who accompanied me from Pérádeniya through some of the estates in Kotmalé and Dimbula as far as Nuwara Eliya, whence he was obliged to return. I afterwards visited the Government plantation and nursery at Hakgala, estates about Nuwara Eliya, Kondapola and Uda Pussellâwa, and returned to Pérádeniya through some of the estates in the Ramboda and Pussellâwa Districts.

3. *The Pátá.*—I was much interested to find the "Pátá de gallinazo" of Mr. Cross, the species hitherto known here as "Magnifolia," about which I have written so much, widely distributed in the Island, chiefly amongst the "Succirubra" trees, between 3,000 and 5,000 feet elevation and maintaining its uniform character and strong rapid growth. This species is in Ceylon generally known as "Hybrid," though it has other names, and is sometimes called "Condaminea." Most planters appeared easily to recognize all their different individuals of it as one and the same plant, and always spoke of them as their "hybrids," but were delighted at a reaction against the hybrid theory and to think it a distinct species which could be propagated from seed, as many of them think with me that it is probably, within certain elevations, the cinchona of the future; some planters were inclined to look upon each individual tree of this as a separate hybrid, and all distinct one from the other, though all most uniform in appearance. In one estate in Lindula, known as Agrakanda, I found that the analysis of the bark of three different trees of this "Pátá" had been reported on by Mr. Howard. It was as follows:—

No.	Quinine.	Cinchonidine.	Quinidine.	Cinchonine.
IV.	6·77	1 84	trace	trace
V.	3·66	4·06	Do.	Do.
VII.	4·08	2 84	Do.	Do.

CINCHONA CULTIVATION.

PROCEEDINGS OF MADRAS GOVERNMENT.

4. These were all large, strong, healthy trees. No. VII., the largest, was a little over 29 feet high and 2 feet in girth, breast high. I do not think correct data as to age was available, but they appeared to be not less than 10 years.

5. This analysis is most interesting, as showing what a very large per-centage in quinine some of this species can give, and also as showing how variable the yield is from different individuals, which is, as far as I can see, equally the case with all the other species of the genus.

6. I found Dr. Trimen exceedingly interested in this species, and he had been cautioning the planters against the hybrid theory. I believe that he is now fully convinced that it is a perfectly distinct species and an undescribed one; and he intends, I believe, to describe and figure it in his Journal of Botany.

7. *Pubescens.*—I also saw trees of our "Pubescens" (or the downy variety of the "Pátá") particularly in Pusselláwa, but they do not appear so abundant as the glabrous species.

8. *Red Bark.*—The growth of "Succiruba" is exceedingly good in many parts that I visited, and I often saw it growing well in deserted coffee, where the soil must have terribly deteriorated. If all old deserted coffee plantations can be planted up with "Succirubra" it will be a great thing for both India and Ceylon; except at the lower elevations, however, the "Pátá" grows even better than the "Succirubra" and is the tree to plant at any rate anywhere above 4,000 feet.

9. *Crown Bark.*—I was not fortunate in seeing any good "Officinalis" plantations of any age or size. I was not however able to go to Haputalé or Uva, the two best districts, I believe, as far as soils and climate go. I saw both at Nuwara Eliya and in Kondapola and elsewhere large plantations of "Officinalis" of very young growth looking exceedingly healthy (when sufficiently protected by an eastern exposure), but the soils everywhere much inferior to what we have on the Nílgiris, often very shallow or with a clayey sub-soil which induces early decay, chiefly from canker; and the planters do not look to longevity for "Officinalis" in these soils, but they uproot at 4 or 5 years of age and replant. We have nothing of this sort in India, and I trust it may never be necessary, but the whole conditions of soil and climate are different. We have not planted any tracts with a sub-soil of impervious clay, and we have a period of drought which, I think, will turn out to be beneficial to "Officinalis" (though probably not for some other species) and antagonistic to canker; whilst in Ceylon, in addition to a very heavy monsoon with often no sunshine for very long periods, they have rain all the year round, which induces early maturity and the too early flowering of the trees. So profitable is the Crown bark at present prices that even in face of this early maturity and early decay the planters are making large profits. On one estate which I visited on Upper Ramboda, called Frotoft, 45 acres of "Officinalis" had been uprooted at 4½ years of age, and the trees had yielded 25 tons of dry bark which was sold at 4*s.* per lb. (=£11,200), and it was said that 1*s.* per lb. would even have paid. There is, of course, much doubt how often soils like this can be replanted; but uprooting in this case was imperative, as the trees were all beginning to go out even at this early age from canker, and this is said to be generally the case, and that coppicing even cannot be resorted to, as it is generally the root canker. I was even told in several estates that whole nurseries had gone out from this cause. This must I think be simply the damping or rotting off of the roots of the seedlings from the use of too rich or damp soil in the beds and the want of of silver sand. On another estate called Loolcondura (in the same vicinity), which I did not visit, I heard that two crops had already been taken off by the same method of uprooting, with very favourable results financially, and that the estate had been planted up a third time. All these estates are considerably below 5,000 feet and consequently at an elevation much below what we grow "Officinalis" at, and this early decay may possibly be averted at the higher elevations about Nuwara Eliya, &c.; the growth there is all very young at present. On one estate called, I think, Thallipody, not far from Nuwara Eliya, I found that all the "Officinalis" trees had been shaved (Java method) before they were barely three years old! The proceeds were said to have cleared the estate of all expenditure, and the trees, small as they were, were certainly nearly all renewing their bark! In another estate in this locality I saw "Officinalis" which had been put down as close as 2½+2½, growing very well. However, there is an opinion amongst some of the planters that close planting can be overdone and so cause unhealthy growth from an early age that may not be easily rectified by subsequent thinnings; it is a question on which actual experience is much required.

10. *Belts of Trees as Break-winds.*—Near Nuwara Eliya I saw an "Officinalis" plantation in a high, bleak, exposed situation, which was exceedingly interesting on account of the systematic way in which belts of *Eucalyptus globulus* had been planted as a break-wind. At a chain apart throughout the plantations, single rows of these trees, each tree at 6 feet apart, had been put down at the same time as the cinchona; they had been topped when young, and grown out with a bushy habit, and the cinchona was growing, comparatively, exceedingly well, where there could have been nothing but most wretchedly stunted growth without this protection. I think this plan can with great advantage be introduced into several portions of our plantations on Dodabetta and at Naduvatam and Pykara, and I would draw the attention of cinchona planters generally to the great

importance and value of these or similar break-winds, and I know of no tree that would answer better than the Blue-gums at high elevations.

11. *Calisayas.*—I had no opportunity of seeing any good plantations of Calisaya such as, I believe, exist in Maskeliya and other parts of the Island, which I had not time to visit; however, I saw some fine trees mixed with other cinchonas and coffee in different estates at low elevations. Considering the fine appearance and growth of one that I saw growing on the estate called Agrakanda in Lindula (about 4,000 feet), I think it probable that finer Calisaya will be grown in Ceylon than in India, and that with this species the moist climate of the Island has the advantage against our droughts; but I have had very little experience with Calisaya. The analysis of this tree by Mr. Howard had given 5·64 per cent. of quinine, 1·22 of cinchonidine, ·44 of cinchonine, and only a trace of quinidine. Two miles from Nuwara Eliya, at the head of the Ramboda Pass, I saw a most remarkable plantation of what were called "hybrid Calisaya." The elevation is too high, I should think, for the species, being about 6,000 feet, and the trees are all quite shrubs, 4 to 6 feet high, densely branched from the base. The plantation is, however, looked upon as one of great value by some experienced planters. I recognized our var. Javanica, but there were quite a crowd of other forms that I have not seen in our plantations (we probably had some of them and they have died out) and which would completely puzzle any botanist. It is quite possible that we have here only a single species, a very protean one, producing all these varieties from the same seed; but it is, I think, more likely that there are many really different species mixed, species which have not as yet been worked out by a botanist; either of these views are, I think, preferable to the hybrid theory. On the subject of classification Dr. Trimen has written the following valuable remarks (*vide* Mr. Owen's "Cinchona Planter's Manual"):—

"The genus Cinchona presents us with a very well-marked and striking instance of a clearly-defined natural group, in which the individuals composing it, instead of as usual being with more or less facility thrown into different sets marked out by clear distinctive characters (and thus forming the 'species' of the naturalist), offer themselves as a crowd of forms closely connected in different directions, but showing only trifling modifications of structure, of a sort usually regarded as of but little systematic value. Such genera are not very uncommon, and the botanist of Europe is but too familiar with cases in *Salix* (willows), *Rubus* (blackberries), and *Rosa* (wild roses)

"This state of things is natural, and has not arisen under cultivation. In 'cinchona' the great majority of the described forms have been found in the Andes themselves, where the genus has a range of over 2,000 miles from north to south and at altitudes from 2,600—11,000 feet, but chiefly between 5,000 and 8,000 feet. It would appear that every district of this extensive area has its own peculiar cinchonas, and very few species are known to range widely through it; none to occur throughout. A very similar statement might be made with regard to the fruticose *Rubi* in Europe"

12. Really careful experiments with the seed of each marked variety or species would be exceedingly interesting, and would probably clear up the doubt whether they are distinct species or all forms of one very protean species; but if the latter be proved to be the case, the botanist will have a most difficult task in the classification of the genus. Analysis is all important in a plantation of this sort, if profit is to be looked to, and the same may be said of the ordinary form of Calisaya or of Javanica or any other of its forms, as it has been proved that forms apparently quite similar in every way may in some individuals be very rich in quinine and in others have no trace of it. The planter has therefore to be cautioned against any indiscriminate growth of "Yellow barks" at this stage of our knowledge, as not only is this an established fact, but we at present know little about the elevation or climate adapted for these species.

13. *Ledgeriana.*—Dr. Trimen informs me that both he and Mr. Moens of Java consider this species as quite a distinct one and not as hitherto supposed only a variety of "Calisaya," and that he has lately described it as such in his "Journal of Botany." He also pointed out to me that the flower pedicels always have a drooping habit not seen in "Calisaya," and that the flower buds want the knob-like apex characteristic of "Calisaya."

The enormous profits of the Ledgeriana plantation in Java under Mr. Moens, and the visit last year of that gentleman to Ceylon, have given a great impetus to the planting of this species in Ceylon. I had not an opportunity of seeing the best or oldest grown in Ceylon, but I saw some large trees and many of young growth, and also experiments with Mr. Moens' system of grafting this species on "Succirubra." I however learnt that no analysis of this bark in Ceylon could in any way be compared with that in Java, and it is probable that the deep, rich, volcanic soil in the latter place is the real cause of the wonderful results. Mr. Moens has obtained as much as 13 per cent. of pure quinine from one tree of this species, and Dr. Trimen tells me that he (Mr. Moens) destroys all trees which on analysis do not give a very high yield, and that he grafts from the richest on to "Succirubra," and that he has a small area of these grafts which are giving most surprising results and astonishing every one. Dr. Trimen also informed me that this grafting on "Succirubra" was resorted to owing to the great difficulty of propagating this species by cuttings; but Mr. Grant in the Ouchterlony valley (I was over his establishment lately) has been most successful with cuttings under glass with bottom heat, scarcely having a failure, so I cannot, I confess, see the advantage of the grafting if cuttings can be grown easily in India, and I believe not only Mr. Grant but also Captain Cox has had no difficulty; the grafting

CINCHONA CULTIVATION.

PROCEEDINGS OF MADRAS GOVERNMENT.

process besides could hardly be resorted to for large areas. It is, however, important I think that we should have some experiments on this plan when we open ground for "Calisaya" and "Ledgers" at a lower elevation. Mr. Moens' plan is described as follows in the Cinchona Manual above referred to :—

"This system has been largely pursued by Mr. Moens in Java for the multiplication of Ledgerianas, with great success. For a description of the method we are indebted to "Viator" and Mr. Kay-Shuttleworth, who visited Java and there saw the operation performed. Succirubra being the commonest and most rapid-growing cinchona, is chosen for the stock. Succirubra plants about a year old are chosen, and to economise space are stumped at a point six or eight inches above the soil. This is done just above a joint. A flat cut is then made in the stem under the bark, which is not removed, sufficiently deep to make a surface large enough to allow a Ledgeriana shoot (cut through diagonally, the cut being one to one and a half inch long), to fit cambium to cambium to the Succirubra, the bark of the Succirubra *over*lying the cut being left intact. The Ledgeriana shoot must be cut just where the hard mature wood ends, and where the branch begins to be tender and succulent from the newness of its growth ; it is then fitted carefully into the cut in the Succirubra stem, the flap of bark put over it, and the whole bound firmly with Berlin wool String pulled out of an ordinary sack will do almost equally well. The operation is simpler if the 'Succirubra' has a double stem, one of which is then cut off diagonally at the fork, leaving a flap of bark at the upper end of the cut ; the Ledgeriana shoot is then cut so that it shall correspond in shape and size with the cut surface of the Succirubra, but a flap of bark is left hanging from its lower end. The two cut surfaces are then fitted together, the flap of Ledger bark overlying the 'Succirubra' stem, and the flap in the Succirubra overlying the Ledger cutting, and thus giving a better hold to the binding. The pots which contain the grafted plants are then laid on their sides, graft uppermost, in propagating frames, and kept until the bark begins to unite, and new leaves to show, when they are placed upright. The Succirubra is cut off just above the graft as soon as the plants are fairly united, and there is no fear of this further mutilation of the tree injuring the young graft, the bandage being removed at the same time. Four weeks is the time that generally elapses before this can be done. It has been proved that a good graft grows faster than an original Ledgeriana tree, and that the qualities of the stock never in the slightest degree affect the tree it bears.

"A skilled labourer can graft from 200 to 250 Ledger cuttings on 'Succirubra' stems every day, and the operation is therefore evidently not a very expensive one. There can be no doubt as to its advisability in all cases where individual trees of special value are to be propagated from."

14. *Crispa.*—I saw abundance of what Dr. Trimen calls the "Crispa variety of Officinalis," and it is the same as we have abundantly represented in the Dodabetta plantations, not differing from ordinary "Officinalis" except in its rather smaller leaves, and often running into the ordinary form so as not to be distinguishable.

15. *Uritusinga.*—I saw no "Uritusinga" in Ceylon amongst the older Crown barks, and I am unable to distinguish this variety from "Officinalis" when they are young.

16. *Hakgala Government Gardens.*—As a cinchona plantation these have been utterly neglected ; the older trees have almost all died out or been cut down, and the coppice not attended to ; they were scarcely worth a visit. There were however numerous nurseries for seedlings of various kinds.

17. *Grass land.*—I saw scarcely any grass-land planting ; unlike the Nilgiris where nearly all the grass land rejoices in an open and gravelly soil, the grass land (or patanas, as they are called) in the Central Provinces have generally a black peaty soil quite unfit for the growth of cinchona, and similar to what we have in swampy ravines only. I dare say there may be suitable grass-land soils in parts that I did not visit, but I only saw some small patches ; but in these "Officinalis" was growing well where planted, but it was quite young.

18. *Importance of Analysis and of the Services of a Chemical Analyser.*—My visit to Ceylon and the advantages I have had of discussing matters with Dr. Trimen, and also of hearing Mr. Moens' views through Dr. Trimen, has made me alter my opinions very much with reference to the value of analysis, and I think it now all important that very great attention should be paid to this subject in our plantations, particularly with reference to "Officinalis" and the "Pátá" (Magnifolia), individuals of which have been proved to differ so one from another in their yield of quinine. We should find out the individuals which give the richest yield and propagate largely from these, and these only, both as to seed and cuttings, continuing the experiment through several generations. Though the experiments might not be altogether satisfactory at first, and though we might find that the seed and even the cuttings of the richest yielders might often give very varied results when planted out over large areas, I feel sure experiments of this sort must be in the right direction, and if persevered in would ultimately give very good or even startling results, as with Mr. Moens, and we should then be able to distribute the very best (and only the very best) seed and rooted cuttings to the public. This, however, can never be carried out satisfactorily unless we have a qualified Chemical Analyser for our plantations as well as a thoroughly practical gardener ; but surely in a question of such importance the expense should not be considered or allowed to interfere.

19. *Cinchona Planter's Manual.*—A most excellent little manual has just been published in Ceylon at the "Observer" office by Mr. T. C. Owen. It treats most fully upon all subjects connected with cinchona planting, and has evidently been most carefully compiled from all the books, pamphlets, and reports on the subject in this and other countries,

and from much personal observation. It is just the book required by the officers in charge of our plantations ; and not knowing that anything of the sort was likely to be published, I had intended, as already reported, drawing up a somewhat similar though much briefer pamphlet, after I had had the advantage of some further experience outside our own limited area ; this, however, will now be unnecessary. I hope that Government will take a certain number of copies of this manual, and that the Nilgiri Cinchona Office may be supplied with 25 copies. I do not know its price, but it is probably not more than 1 rupee or 1½ rupees.

ORDER *thereon*, 12*th October*, 1881, *No.* 1,513.

Miscellaneous.—No. 168.

THIS account of the visit to the cinchona plantations in Ceylon, which the Conservator of Forests has recently made, will be forwarded to the Secretary of State and communicated to the public in continuation of G.O., 29th August last, No. 1,280.

2. There is much of interest in the observations which Colonel Beddome has recorded, and the Government are indebted to him for his enquiries and suggestions, to which doubtless effect will be given in the management of the plantations under his charge.

3. The proposal in paragraph 18 will be commended to the attention of the Secretary of State with reference to paragraph 18, G.O., No. 1,280.

4. The Government of Ceylon will be requested to obtain and transmit 100 copies of Mr. Owen's Manual, and on receipt 25 copies will be supplied to the Nilgiri Cinchona Office, as requested in paragraph 19.

True Extract.

(Signed) C. G. MASTER,
Secretary to Government.

XXX.—1881.

ESTATES MEDICAL WANTS.

CORRESPONDENCE

RELATING TO THE

MEDICAL WANTS ORDINANCE, No. 17 OF 1880.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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ESTATES MEDICAL WANTS.

No. 1.

Governor Sir J. R. Longden, K.C.M.G., to the Right Hon. the Earl of Kimberley.

ESTATES MEDICAL WANTS.

No. 287.—*Legislative.* Kandy, 30th December, 1880.

Correspondence.

My Lord,—In connection with the despatch of your lordship's predecessor noted in the margin and previous correspondence, I have now the honour to submit for the signification of Her Majesty's pleasure an authenticated copy of an Ordinance passed by the Legislative Council intituled "An Ordinance to provide for the Medical Wants of Immigrant Labourers in certain Planting Districts," No. 17 of 1880.

Sir M. E. Hicks-Beach to Governor Sir J. R. Longden. No. 56, 18th February, 1880.

2. By this Ordinance, if confirmed, the Ordinance No. 14 of 1872, passed for the same object under the title of "An Ordinance to provide for the Medical Wants of the Coffee Districts," will be repealed, and the medical care of the immigrant labourers will be taken over by the Government.

Repeal of existing Ordinance.

3. I regret that I have been unable to secure the co-operation of the Planters' Association or the member representing them in this measure. I would willingly have modified any details of the measure in order to secure that co-operation which, as I have repeatedly said, is most desirable. But the opposition of the Planters' Association to the Bill went beyond any details and attacked the first principle on which the Bill is founded, namely, the liability of the planters to find medical aid at all for their immigrant labourers. I enclose a copy of the amendments to the Government Bill proposed by the Planters' Association. Your lordship will see that it was proposed to alter the very title of the Bill, and instead of making it a provision for the medical wants of the coffee districts to make it a measure "for the extension of the Civil Medical Department." This was the key-note of their amendments. The Association proposed to repudiate the obligations heretofore acknowledged, and they demanded that the cost of providing for the medical care of their labourers should be defrayed by an addition to the import duty on rice,—the food of the people.

Opposition of Planters' Association.

See my despatch No. 506 of 20th December, 1879, para. 24.

4. It was useless to meet this new demand in any other way but by a direct negative; and though I was willing to accept the suggestions of the Planters' Association on minor points, I felt that I could not concede the principle contended for by the planters without reversing the whole policy of the Government for many years past, and the second reading of the Government Bill was pressed to a division, in which the Government had the support of three out of the six unofficial members.

Course pursued by Government.

5. Before proceeding with the remarks I have to submit on the enclosed Ordinance, it may perhaps be convenient to recapitulate briefly the history of the measure. Although more than half a century has elapsed since coffee planting was taken up by the British, it is still in the main as true now as it was when Sir Emerson Tennent wrote in his book on Ceylon that "no temptation, no prospect of advantage has hitherto availed to overcome the repugnance of the Sinhalese and Kandyans to engage in any work on the estates except the first process of felling the forest; every subsequent operation must be carried on by coolies from Malabar and the Coromandel Coast." Thus it follows that the work of the coffee estates is, with rare exceptions, carried on by Indian coolies, who come and go between the Malabar Coast and Ceylon every year in great numbers. The welfare of the labourers thus imported has always been an object of solicitude to the Government, but it is not necessary for my present purpose to go further back than the law of 1865. In that year an Ordinance was passed "to amend and consolidate the law relating to servants, labourers, and journeymen artificers under contract for hire and service." *Verbal* contracts, I should here remark, are recognized by the Ordinance as well as written contracts—an important point, as there are few labourers engaged under written contract. The law is sufficiently stringent in regard to the performance of labour on the one hand, and on the other hand it defines the duties of employers, and in particular puts upon them the following obligation:—"Any servant who shall be incapacitated by sickness from labour whilst in the service of any employer shall be entitled to lodging, food, as well as medical care, *at the expense of such employer** during such incapacity; provided that the employer shall not be bound to pay to the servant during such period his wages in addition." The Ordinance from which I quote this clause is the existing labour law of the Colony, and that it is no obsolete enactment may be judged from the fact that 9,374 persons were only last year brought before the Magistrates' courts charged with offences under it. Thus

Review of the history of the Bill.

Tennent's Ceylon, edition 1859, vol. 2, p. 233.

No. 11 of 1865.

Clause 27.

No. 11 of 1865.

Judicial statistic for 1879, page 6.

* The *italics* are mine.—*J. R. L.*

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the obligation to provide medical care for their labourers at their own expense is imposed upon the planters by the very law under which alone they can enforce their labour contracts, and I submit that it cannot be permitted to the planters to repudiate their obligations in this respect. These obligations, though never repudiated, appear to have been but imperfectly fulfilled, and in 1871 the question of providing more effectually for the medical care of the coolies was discussed by the then Government with the Planters' Association It was then that the division of the coffee plantations into districts was proposed by Sir Hercules Robinson for facilitating the working of a scheme of medical relief, and was approved in your lordship's despatch No. 38 of the 15th of February, 1872 In the Legislative Session of that year the Ordinance No. 14 of 1872 was introduced and passed, though then as now without the co-operation of the Planters' Association, and against the vote of their representative. Unhappily, from various causes the Ordinance failed to benefit the coolies to the full extent that had been anticipated.

In July, 1877, when the ill success of the measure had become apparent, the Planters' Association made a representation on the subject to my immediate predecessor, declaring that the Ordinance was "costly and vexatious to ratepayers and a source of increased disease and death among the Indian labourers for whose special benefit it was framed," and they asked that the Ordinance might be re-modelled by a mixed Commission of Planters and Civil Servants. Thereupon the draft of an Ordinance was prepared, by which the whole medical care of the coolies would be transferred to the Government. This draft was sent to the Planters' Association, but was not approved by them, and as great differences of opinion prevailed as to the best mode of dealing with the question, the planters again pressed for a Commission. About this time I arrived in the colony, and finding that, although all parties concurred in deprecating the Act of 1872, there was no general concurrence of opinion as to the principles upon which the medical care of the coolies in future should be conducted, I granted the Commission asked for. The Commission was appointed in April, 1878, and having taken evidence at great length reported in March, 1879. In 1879 a Bill, framed chiefly upon the recommendations of the Commissioners, was laid before the Legislative Council, but the Planters' Association expressed their dissatisfaction at the Bill, and at their earnest request the Bill was not pressed, on the understanding that the Planters' Association would come to a decision and lay their views before the Government early in the present year. The views of the Planters' Association were not laid before the Government until the present Bill was introduced into the Council, and your lordship will see from the enclosed copy of the Bill as amended by the planters that their intention is to repudiate the obligation now imposed upon them by law.

See Report enclosed in my despatch No. 356 of the 11th of September, 1879.

Vide my despatch No 506, 20th December, 1879.

Question for decision.

6. This, then, is the first question which has to be settled: Whether the obligations created by the Ordinance of 1865 shall be maintained, or whether the planters shall be relieved of those obligations, and the medical care of the coolies be transferred to the Government and paid for from the general revenue?

Reasons for retaining liability of employers to provide medical care for labourers.

7. A precedent may be found for the latter course in the colony of British Guiana, but the circumstances of Ceylon are so different to those of Demerara that I do not think the precedent has any real force. In British Guiana the cost of introducing each immigrant from India varies from £20 to £23, towards which the colony pays only £2 1*s.* 8*d.* (ten dollars). In Ceylon the cost of introducing the immigrants probably averages less than 5 shillings a head, and the colony pays towards it an annual sum of Rs. 118,530. It may be doubted whether in the large majority of cases planters pay anything in respect of the immigrant before his arrival on the estate, which is not charged against his wages. Again, in Demerara the whole colony—the town population and the native population not resident on the estates, as well as the whole native and immigrant population employed and resident on the estates—may be said to live on, by, or through the sugar industry. The exportation of native wood from British Guiana is comparatively trifling, and the raisers of native produce, plantains, &c., find their customers among those who live by the wages of planters or merchants. Practically, whether the immigration medical service were paid from the immigration fund or from the general revenue is immaterial, in this sense, that it all has to be paid from the price of sugar, as there is no other fund from which it can be paid. Individually, the incidence of the tax may be varied, but the immigration fund and nine-tenths of the general revenue are derived from the same sources, and the cost of the immigrant medical service would fall almost entirely on the same class whether it be charged on the immigration fund or on the general revenue. In Ceylon all this is different. Enormously as the colony as a whole has benefited by the coffee industry, it may be said that it has scarcely affected the native population in their occupations or their mode of living. I have already said that the cultivation is carried on by immigrants alone, and the bulk of the native population are in no way connected with coffee. To throw the cost of the immigrant medical service of Ceylon upon the General Treasury would therefore be a very different thing here to what it is in Demerara, and would shift a burden, which, rightly viewed, is a part of the cost of production, from the growers of coffee to the native population, the vast majority of whom do not derive their living in any way through the coffee industry. It is worth while noticing in this place another peculiarity which distinguishes Ceylon from Demerara. In the latter colony the sugar estates are without exception settled along the shore of the sea or where nearly the

See Estimates, item Immigration

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whole population is concentrated, and the immigrant surgeons attend the sick in the villages, the prisons, the lock-ups, the police stations and hospitals in their respective districts, as well as the immigrants; and if there were no surgeons employed for the immigrants, the Government would have had to provide surgeons for the general population in providing for the public service. In Ceylon the coffee plantations, as is well known, have been hewn out of the ancient forests, away from the habitations of the natives, and out of reach even of the scanty means of the medical relief to be found in the native villages. Apart from the existence of the immigrants brought to the estates and employed thereon, there could be no reason for sending medical officers to the coffee districts at all, for their services are required only for the planters themselves and their families, servants, and labourers.

Opinion that the liability should be retained.

8. Looking at the question from every point of view, I do not think that the Government should give up the principle embodied in the law of 1865,—that the planters should be bound to provide their labourers with medical care at their own expense, and that the money required for this purpose should therefore be raised in or from the planting districts.

Proposition of planters to increase import duty on rice.

9. If it be decided by your lordship that the cost of the medical care of the coolies shall for the future be borne, as it has been in the past, by their employers, it will not be necessary to impose any additional taxation on the general public to meet the charge; but if it be decided to throw that cost on the general revenue, it will be necessary to consider how the funds are to be raised to meet it. The proposition of the Planters' Association is that "It shall be lawful for the Governor, with the advice of the Executive Council from time to time by Proclamation in the *Gazette* to impose a duty not exceeding 3 cents per bushel on all rice imported at Colombo, Batticaloa, Galle, or any other port the Governor may select." I think this proposition open to several grave objections. In the first place, I think any increase to the duty on rice is inexpedient. The present rate of duty is 29 cents per bushel, and therefore the proposed increase is rather more than 10 per cent. on the present duty. The import of rice last year was 5,895,414 bushels, and the new duty of 3 cents would produce Rs. 176,862 if the duty were levied on *all* the rice imported into Ceylon, and this sum would hardly suffice for the purpose. But the Planters' Association do not contemplate taxing all the rice imported into the Island at the same rate. Their proposal is to tax the rice imported into Colombo, Batticaloa, and Galle, exempting from duty the large quantity of rice imported into Jaffna and the northern ports, feeling apparently the injustice of requiring the population of the Northern Province, in which there is not a single coffee estate, to contribute to the cost of the medical care of the labourers on coffee estates. A differential duty of this kind between different ports of the same Island is in my experience a novelty; and I think it would be most objectionable to introduce an innovation so contrary to the existing law of the colony and to ordinary custom. But this part of the proposal is not merely unprecedented and objectionable; it is also radically unjust. If it be felt to be unfair to require the inhabitants of the Jaffna Peninsula to pay the increased duty, it is equally unfair to call on the population of the maritime provinces to pay duty on the rice imported at Colombo and Galle for their use. In respect to the port of Galle the case would be especially hard, as the population of the Southern Province is about 400,000, and there is only one coffee district in it - Morowakkóralé—in which there are less than a thousand coolies employed. No doubt the idea of the planters was to tax chiefly the rice imported for the coolies on estates; but it is impossible to tell how much of the rice imported into Colombo itself is consumed by the population of the town and surrounding districts, and how much is consumed on the estates. It is to be remembered that, although the opening of the coffee plantations and their cultivation by immigrant labour largely increased the importation of rice, there has not been a time for centuries before a single coffee plantation was opened that Ceylon has not been obliged to import rice. As early as the 14th century, after the civil wars between Tamils and Sinhalese, in which the vast irrigation works of earlier ages were destroyed, Ceylon had become dependent on India for supplies, and annually imported rice. This seems to have continued through the whole period of the Portuguese domination and of the Dutch. The latter, indeed, encouraged agriculture, and it is said that "the time was eagerly expected, but never arrived, when the necessity would cease for the importation of rice for the troops." Under the British occupation the importation continued, and in the four years 1826-29, just before coffee planting began on any considerable scale, it averaged 596,970 bushels. Since that time the native population, no longer kept down by civil wars, has enormously increased; there has been a great immigration from India, and the importation of rice has increased ten-fold, much of which is due to the coffee enterprise; but a fairly large proportion is due also to other causes.

Blue Book, 1879

Tennent's Ceylon, Vol 2, p. 7

Vol 2, p. 58.

Increase of duty on rice impolitic.

10. For these reasons I feel that the increase of the duty on rice would be impolitic. I think it inexpedient to levy import duties on the same article at different rates in different parts of the Island. I think it unjust to levy an import duty on rice imported by the general native population for their own consumption to pay for the medical care of the immigrant labourers brought into the colony solely for the cultivation of the coffee estates. I think it would be impossible to assess the duty so that it would fall only upon the rice imported for the consumption of immigrants upon the estates. Even if this were possible, I would point out that the duty on this restricted quantity would have to be doubled in order to furnish the requisite sum, and there would be a danger—I would almost say a

ESTATES MEDICAL WANTS.

CORRESPONDENCE.

Resumé of the Ordinance as passed.

great probability that if the duty were so imposed the planters would raise the price of rice on their estates and throw the entire burden on the coolies.

11. The Ordinance as passed by the Council provides that the Governor shall undertake the medical care of the labourers employed on coffee, cinchona tea, or other estates on which immigrant labour is employed. For this purpose the estates are to be grouped in districts, a medical officer appointed to each, with an assistant where necessary, and district hospitals are to be organized, to which the superintendents of estates may, and in certain cases must, send their coolies. The medical officers are to visit the hospitals daily, and sick persons not in hospital as often as may be required. It is made the duty of superintendents under penalties to maintain the habitations of their people in fair sanitary condition, to keep registers of their people, and to report all cases of sickness. In order the better to carry out the last duty it is required under penalty that every kangani (or head of a gang) on an estate shall inform the superintendent of every case of sickness in his gang. The Governor and Executive Council are empowered to make rules for the guidance of the District Medical Officers and their assistants, for the regulation of their private practice, for the keeping of registers, and for the government of district hospitals. The whole scheme is to be worked under the general supervision and direction of the Principal Civil Medical Officer, to whom the District Medical Officers are expressly subordinated.

District Medical Officers and assistants. Clause 8.

12. In the appointment of the District Medical Officers I have followed to a great extent the 10th clause of the Immigration Ordinance passed under your lordship's directions in British Guiana, except that the districts are not named in the Ordinance, as it is necessary constantly to revise and alter them, for new estates are opened, old ones abandoned, and existing estates divided or amalgamated, with a frequency unknown in the West Indies. It will be necessary in any appointment of the District Medical Officers under the Ordinance to stipulate that they shall not be entitled *as a matter of right* to leave of absence, although such right may be freely accorded to them within the limits of the Colonial Regulations when it is practicable to provide for their duties without additional charge. The commencing salary of each District Medical Officer is fixed at Rs. 4,000, rising to Rs. 5,000 after ten years' service. The Medical Assistants will receive on first appointment a salary of Rs. 1,000, rising to Rs. 1,500. It is contemplated to appoint as such assistants native Tamils educated at the Ceylon Medical School, who have received the certificate of the school, speaking Tamil as their native language and acquainted with the habits and manners of the Tamil labourers. These assistants will, I think, form the most valuable part of the new system. Through them we may expect to acquire the confidence of the natives in European modes of treatment, without which all provision for their medical relief will be comparatively unsuccessful.

Clause 11.

Use of civil hospitals

13. One clause in the Ordinance requires some explanation. The Governor is empowered to appoint existing civil hospitals to be hospitals for a district. There are in the coffee districts five civil hospitals which were established for the native population gathered in the towns of Kandy, Mátalé, Badulla and Gampola, and at Nuwara Eliya. It is proposed with a view to economy to make use of these hospitals where it can conveniently be done to serve the districts in which they are respectively situate.

Medical relief fund

14. The great difficulty that has been felt is the difficulty of assessing the cost of medical relief equitably upon the estates. Under the Ordinance of 1872 (which is still in force) the requisite sum is levied by an assessment upon the average of each estate. The inequalities and injustice of an assessment made on this basis have been loudly complained of, and are fully stated in the twenty-third paragraph of my despatch of 20th December, 1879, No. 506. It is sufficient here to say that under this system an estate yielding at the rate of two hundredweights of coffee to the acre is assessed at the same rate per acre as an estate yielding ten hundredweights. Such an assessment carries the injustice of it on its face. In place of this I proposed in my despatch above-named an assessment of each estate according to the number of coolies employed upon it; but I pointed out at the same time the difficulties that would be encountered in levying the assessment on this basis. However, on receiving the despatch of your lordship's predecessor approving this mode of levying the charge, I proposed to levy the amount in this way, and in the first draft of the Medical Aid Ordinance it was provided as follows:—

No. 56, 18th February, 1880.

"The cost of such medical care shall be paid out of a rate to be levied on the estates in proportion to the number of coolies employed thereon in manner hereinafter directed."

Upon full consideration this clause was altered in Executive Council on account of the difficulties attending the collection of accurate information as to the number of coolies on the estates, and a duty* at the rate of 20 cents per hundredweight on coffee, &c., upon the actual produce of the estates was substituted. As the whole amount to be raised will be the same in either case, and as the number of coolies employed on estates commonly bears a fair proportion to the produce on all estates, it is probable that the amount which each estate will be required to pay as a tax on its produce will be the same or nearly the same as it would be required to pay if an assessment were levied on the number of coolies, but by levying the duty on the produce the expense, the delays, and the troubles to superintendents

* The duty is equivalent to about 0·3 per cent. on the present value

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which must be involved in the assessments will be avoided. Nevertheless, however, the duty has been as violently opposed as if it were an additional tax imposed for the purposes of adding to the general revenue, instead of being a substitute for a tax, the injustice of which had been complained of. When the second reading of the Ordinance was carried, the Member for the Planting Community entered a protest against the imposition of the duty, and declaring in favour of the increased duty on the importation of rice. I enclose a copy of this protest. Personally, I myself am of course opposed to taxes on produce of all kinds, whether raw or manufactured; but this duty is not in reality a *tax*, but is a part of the cost of production. This will be at once evident if it is borne in mind that, as the law stands, the employer is liable for the cost of the medical charge of his coolies, and this charge has been only undertaken by the Government in default of the employers. The cost of such medical charge, if undertaken by the planter, would assuredly have been a part of the cost of production, and it does not lose its character by being defrayed in the first instance by the Government and then recovered by a duty on production.

No. 506 of 20th December, 1879, paragraph 23. Export duty advocated by Planters' Member in 1879.

15. In my despatch reporting on this question a year ago, I observed that the scheme for payment of medical charges put forward by the representative in the Council of the planting interest, whose protest against the duty on exported produce I enclose, was an export duty on the coffee actually exported, by which each estate would be taxed according to its actual produce. I venture to quote his words as printed in the official record of the debates of the Council:—

"It was the opinion of many that that the best way was to hand the whole thing on to Government, and have an export duty on the chief products, coffee, Liberian coffee, cinchona, tea, and cocoa. The export duty could be fixed If he took a very low estimate, and supposed there was an export of 500,000 hundredweights, that at an estimate of 25 cents per cwt. would give Rs. 125,000. Cinchona should be taxed in proportion to value, and tea at a lower rate than coffee. *The fairest and most practical way of collecting the assessment would be by a small export duty* * If the local and home Government could agree to an import duty on rice, that would be the fairest as directly affecting all the immigrant population, for whom medical aid should be provided as much for coolies on the estates.† No extra machinery would be required for an export or import duty, and there would be no trouble and inconvenience in collecting the assessment. With an export duty those best able to pay would have to pay the most, and they who could ill afford it would have less to pay."

I think that, considering this expression of opinion a year ago, I am justified in attributing the present opposition to the duty on produce rather to a desire to shake off the burden altogether and saddle it upon others, rather than to an objection on principle to the form of the tax.

Conclusion

16. I would willingly have adopted any other means of raising the money if I could have devised any that was at once practicable and fair. Assessment per acre had proved unfair. Assessment per cooly was admitted to be impracticable, and the duty on produce has been adopted as the mode of assessing the cost likely to be the fairest in the long run to all; and I would venture to quote here in reference to this question the words in relation to this Ordinance with which I closed the late session of the Council:—

"To export duties as a means of raising general revenue I am directly opposed, and I have only assented to the imposition of the duties to be levied under this Ordinance because under some form or other the amount required to be raised for the Medical Aid Fund has to be paid by the employers of immigrants, and I believe that this mode will be found more equitable in its incidence and more economical in its collection than the assessment which will be abolished. If, however, any fairer or more economical mode of raising the fund can be suggested, the Government will willingly consider it; for it is comparatively immaterial by what machinery the fund is raised, so long as the principle is maintained that the cost of the medical care of the immigrant coolies shall be borne by them for whose benefit those immigrants have been and are annually introduced and are employed.

I have, &c.,

J. R. LONGDEN.

P. S.—Having regard to the important questions involved, the operation of this Ordinance has been deferred, and it is only to come into force on such day after the 30th June, 1881, as may be proclaimed.—*J. R. L.*

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* The *italics* are mine.—*J. R. L.*

† I concur in this, but the speaker forgot to state that in Colombo, Kandy, and other places where the immigrant population not resident on estates is chiefly gathered, medical relief is provided by Government hospitals, asylums, and dispensaries. Special medical aid is required in the coffee districts, precisely because the coolies employed there are removed out of reach of the medical aid provided by the Government for the general population.

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CORRESPONDENCE.

No. 2.

Lieutenant-Governor the Hon. J. Douglas, C.M.G., to the Right Hon. the Earl of Kimberley.

No. 12.—*Miscellaneous.*

The Cottage, Nuwara Eliya, Ceylon, 5th March, 1881.

My Lord,—I have the honour to transmit herewith a memorial from the Planters' Association of Ceylon,* praying that your lordship will not advise Her Majesty the Queen to sanction Ordinance No. 17 of 1880, which Ordinance was submitted for confirmation in Sir J. Longden's despatch No. 287 of 30th December last.

The question at issue between the Planters' Association and this Government, whether the cost of providing medical attendance for the immigrant labourers employed upon estates be borne in future by the employer or be defrayed from general revenue, has already been so fully dealt with in the despatch above referred to, that I need trouble your lordship with but few remarks in reference to this memorial.

It has for many years been incumbent upon the employers of immigrant labour in Ceylon to provide gratuitous medical treatment for their coolies, but as long as the estates upon which the coolies were engaged were situated within easy reach of the centres of population at which hospitals are provided for the general use of the public, no special provision was deemed necessary for the purpose, trivial ailments being treated upon the estates by the superintendents, while the more serious cases were sent to the nearest hospital upon payment by the employer.

Within the past fifteen years, however, coffee cultivation has been extended into districts more or less wholly devoted to that industry and too far distant from the general hospitals to allow of the sick being sent to them. It is for this reason therefore that it has been held by the local and by Her Majesty's Government that the employer is bound to provide medical attendance and hospitals for the labourers so employed by him. I question whether the medical treatment of the labourers could, under these altered circumstances, be with propriety confided to unskilled superintendents, and it seems but reasonable that the cost of such special arrangements as may have to be provided should fall not upon the general revenue but upon the employer.

If the above conclusion be correct, the only remaining question appears to be in what manner least onerous to the employer the burden can be met of supplying medical treatment to his coolies, and the proposed duty on produce exported—which amounts to about one-third of one per cent. upon the value—affords beyond a doubt the least burdensome mode of taxation as well as the most economical of collection that has hitherto been devised for the purpose.

I have, &c.,
J. DOUGLAS.

No. 3.

The Right Hon. the Earl of Kimberley to Governor Sir J. R. Longden, K.C.M.G.

No. 89.—*Ceylon.*

Downing-street, 18th March, 1881.

Sir,—I have the honour to acknowledge the receipt of your despatch No. 287 of the 30th of December, and to convey to you Her Majesty's gracious confirmation and allowance of Ordinance No. 17 of 1880, entitled "An Ordinance to provide for the Medical Wants of Immigrant Labourers in certain Planting Districts."

I have also received your despatch No. 14 of the 13th of January, forwarding the Queen's Advocate's report upon the Ordinance.

2. The Ordinance was introduced in consequence of the failure of the voluntary system to provide adequately for the medical care of the coolies on the coffee estates, and in view of the understood wish of the planters that Government should directly undertake this duty instead of leaving to the local committees; but the method of raising the necessary funds adopted in the Ordinance, viz., levying an export duty on coffee, tea, cocoa, and cinchona, appears to me to be open to much exception. There are well-known objections to the principle of an export duty which I need not here enumerate, and which render it inexpedient as a general rule to adopt that mode of raising revenue unless very peculiar circumstances preclude a Government from having recourse to the other modes of taxation, and in the present case it appears to me to be especially impolitic to subject to a special tax the rising industries of tea, cocoa, and cinchona planting. Those industries have passed sufficiently out of the experimental stage to be recognised as supplementing in a very valuable degree the leading enterprise of coffee cultivation. But they are not yet so thoroughly established as to have reimbursed the exceptional expenditure involved in the introduction of a new staple. For these reasons I think it preferable to revert to your original proposal for assessing the payments to be made by the employers of Indian labour on the basis of the number of adult labourers employed on each plantation, taking the average number during the last preceding year, or a longer period if necessary. It may deserve consideration whether this tax should not be either reduced or altogether waived in the case of a young plantation which has as yet produced no

* Not printed.

returns; but on this and other details I shall be glad to receive your observations after your Government has carefully reconsidered the subject.

3. With regard to section 17, I am inclined to think that the medical officers should be required to visit the cooly lines on the estates in their respective districts more frequently than once in every six months; but it will be possible to remedy this if necessary, hereafter, when some experience has been gained of the working of the new scheme, as to which I shall be glad to be kept duly informed.

* * * * * * *

I have, &c.,

KIMBERLEY.

No. 4.

The Right Hon. the EARL OF KIMBERLEY to Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G.

Ceylon.—No. 125. Downing-street, 12th April, 1881.

SIR,—I HAVE the honour to acknowledge the receipt of your despatch No. 12 of the 5th ultimo, forwarding a memorial from the Planters' Association of Ceylon against the "Medical Wants Ordinance, 1880."

2. The memorialists will doubtless have been made aware that the Ordinance has already received Her Majesty's confirmation, but that I have expressed my opinion that an assessment on the employers on the basis of the number of adult labourers employed on each plantation would be a preferable mode of raising the funds required for the purposes of the Ordinance to the export duty provided by the Ordinance.

3. I request that you will inform the Planters' Association that before advising Her Majesty to confirm the Ordinance I fully considered the arguments which had been urged on their behalf, and which are repeated in their memorial, in favour of transferring the cost of providing for the medical care of the immigrants employed on the coffee estates from the owners of the estates to the general community of the colony.

4. In my opinion it is clearly the duty of the employer to provide for the medical wants of the immigrant labourers employed by him, and he cannot with justice be relieved of any part of this obligation at the expense of the general taxpayers. This appears to be admitted by the memorialists as regards medical attendance on the plantations and the maintenance in hospital of sick labourers whose cases are too serious to be treated on the plantations; but they contend that it is the duty of the Government to provide hospital accommodation, and they complain that the failure of the Government in this respect has led to the suggestion that special provisions are required for the medical treatment of the coolies. I take an entirely different view of the duty of the Government, and it appears to me that if hospitals were to be provided at the public expense for districts far removed from the centres of population, and almost exclusively inhabited by the planters and the immigrants who are employed for short periods on their estates, a great injustice would be inflicted on the community at large, who would have to bear part of the cost of production of the coffee and other produce of the plantations.

5. The reason why special medical arrangements are now required is that the system hitherto in force, by which the provision of medical attendance and hospital accommodation for the labourers on the coffee districts was entrusted to the management of the planters subject to the supervision of Government inspectors, has been found to be ineffective, and it has therefore become necessary for the Government to take in hand the medical care of the immigrants, and I cannot see that this change (which has been made at the request of the planters) gives them any claim to be relieved from the obligation to provide for the immigrants whom they employ.

6. It is true, as stated in the memorial, that there has been a large increase in the revenue of the Colony since 1859 (although there has been a considerable decline in the last two or three years), and that this increase has been due in great measure to the planting enterprise. I cannot admit this growth of revenue entitles the planters to expect that the care of their labourers shall be made a charge on the public funds, since the rise in the revenue has been accompanied by augmented expenditure, a large proportion of which has been directly or indirectly devoted to the coffee districts. Nor do I find that the inhabitants of the low-country have benefited in undue proportion from the strengthening of the Civil Medical Department.

7. With regard to the argument adduced in clause XI. of the memorial from the fact that the employment of Tamil immigrants is not confined to the hill districts, it is sufficient to observe that the expenses to be borne by the planters in the hill districts cannot be affected by the employment of Tamil labourers elsewhere, as under the system of assessment which I have proposed, each planter will contribute only for and in respect of the number of coolies whom he actually employs.

I have, &c.,

KIMBERLEY.

ESTATES MEDICAL WANTS.

CORRESPONDENCE.

No. 5.

Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G., to the Right Hon. the EARL OF KIMBERLEY.

No. 174.—*Miscellaneous.*

Queen's House, Colombo, Ceylon, 8th July, 1881.

MY LORD,—I HAVE the honour to acknowledge the receipt of your lordship's despatches Nos. 89 of the 18th March and 125 of the 12th April on the subject of Ordinance No. 17 of 1880, which provides for the Medical Wants of Immigrant Coolies in certain Planting Districts.

2. I thought it advisable upon the receipt of the first of the above despatches not to anticipate in any way your lordship's reply to the memorial of the Planters' Association, and confined myself, therefore, to gazetting in the usual manner Her Majesty's gracious confirmation of the Ordinance. Upon the receipt of the second despatch the decision of Her Majesty's Government was communicated without loss of time to the Association, in a communication of which a copy is enclosed.*

3. Your lordship may rest assured that the best endeavours of this Government shall not be wanting to give effect to the instructions now received, that the cost of the medical aid should be recovered from the employers of Indian labour by an assessment on the basis of the number of adult labourers employed on each plantation; but I must not disguise from your lordship that the collection of such an assessment will be a most difficult operation. I have indeed been assured by every estate proprietor whom I have consulted on the subject that its collection upon any reliable basis will be impossible.

4. It is to be remembered that the immigrant labourer in Ceylon is not, as in Mauritius and in the West Indian colonies, indentured before a stipendiary magistrate. His engagement here is a mere verbal monthly contract, as a rule, with the "kangany" of his gang, who again, in the second place, makes an agreement with the estate superintendent; and although a correct record is no doubt kept, in the shape of what is called a "check roll," of the labourers employed upon daily wages, this by no means represents the total labour employed on the estate, much of the work being done by contract (weeding, for example, at so much per acre); and, as a consequence, few superintendents have any accurate data available as to the number of immigrant labourers whom they employ.

5. It is already incumbent upon every employer of Indian coolies to render quarterly returns, in the form of which a specimen is annexed,* of the immigrant labourers employed on his estate. (Art. 2 of Ordinance No. 17 of 1862.) But these returns are notoriously unreliable. I append a list* compiled from a dozen estates taken at random in the Central Province, exhibiting the discrepancy between the figures as furnished by the superintendents for the quarter ended on 31st March last and those as taken by the Census on the 17th February. The total result is even more striking, for, whereas the estate returns for the Kandy District sent in for the first quarter of the current year give the number of estate coolies at 36,688, the numbers ascertained by the Census are slightly in excess of 75,000. The estate returns of the whole Province for the quarter in question are not as yet complete, but for the last quarter of 1880 they exhibit a total of 93,570 immigrant labourers only, as compared with 182,535, the figures arrived at by the Census.

Para 14 of Sir J. Longden's despatch No. 287 of 30th Dec., 1880

6. I have not felt it right to withold from your lordship the apprehension felt by myself and the Executive Council (and which has already been expressed by Sir J. Longden) —that any attempt to levy an assessment based upon the number of immigrants employed upon estates will be liable to failure unless the furnishing of incorrect returns is subjected to penalties such as would excite grave opposition among the planting community. Still I am bound to admit that the present system of acreage assessment is open to such serious objection that, of the two alternatives, the attempt at an assessment on labour appears to me preferable, even though its success be involved in doubt.

7. I propose to have the draft of an Ordinance, amending that portion of Ordinance No. 17 of 1880 which relates to export dues, and substituting an assessment on the number of labourers employed, prepared before the return of Sir J. Longden for consideration by him. If I rightly understand your lordship, the decision of Her Majesty's Government against allowing an assessment upon the produce of estates exported is final, and would not be open to re-consideration in the event of the planting community again proposing that the necessary funds should be raised by such an assessment.

8. As regards the question of exempting plantations of tea, cocoa, and cinchona from any medical assessment, I would venture to point out that this could only be effected in one of two ways,—by throwing upon the general revenue the cost of the medical aid to the labourers on these plantations—a step which would violate the principles laid down in your lordship's despatch No. 125 of April 12—or by charging that cost to the assessment levied upon the coffee industry, or in other words by making the coffee plantations bear the cost of the medical aid required for plantations of tea, cocoa, and cinchona. Against this the coffee planters would have grounds of not unjust complaint.

9. But as a matter of fact, tea, cocoa, and cinchona are to so large an extent cultivated on and in connexion with coffee estates and by the same coolies, who divide

* Not printed.

their time between the different products, that it would not be possible to distinguish between the time spent by a labourer upon, for example, weeding the coffee and cinchona trees growing side by side in the same field.

10. And, for similar reasons, I have been unable to devise any plan by which young plantations not yet in bearing could be relieved from assessment. That assessment would have to be borne either by the general revenue or by the remainder of the planting community. Complications would also arise in the not uncommon instance where coolies from an old-established estate are employed for part of their time in opening new plantations upon adjoining land, and much evasion of the assessment would of necessity result.

* * * * * * *

I am, &c.,

J. DOUGLAS.

No. 6.

The Right Hon. the EARL OF KIMBERLEY to Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G.

Ceylon.—No. 264.

Downing-street,
12th August, 1881.

SIR,—I HAVE the honour to acknowledge the receipt of your despatch No. 174 of the 8th of July, on the subject of the manner in which provision should be made for the medical care of the coolies in the coffee districts.

2. I have reconsidered this question, but I am unable to alter the decision which was conveyed to you in my despatch No. 89 of the 18th of March, that the cost of such medical care should be recovered from the planters by an assessment based on the number of adult labourers employed upon each plantation.

3. This is in my opinion a far more equitable scheme than that of an export duty, which would fall very unequally on the planters. I recognize, however, the difficulties which you point out, of putting it into practice, and if after a fair trial these should prove insuperable, it will be necessary to devise some other method of assessment.

4. The furnishing of incorrect returns must be prevented as far as possible by the imposition of adequate penalties.

5. Upon further consideration, I agree with you that it would scarcely be fair or indeed practicable to exempt tea, cocoa, and cinchona, and young plantations not yet in bearing, from assessment, and they should therefore be included, as was originally intended, in the scope of the Ordinance.

I have, &c.,

KIMBERLEY.

XXXI.—1881.

REPORT OF THE COMMITTEE

APPOINTED TO SECURE THE

REPRESENTATION OF CEYLON

AT THE

MELBOURNE INTERNATIONAL EXHIBITION, 1881.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

MELBOURNE INTERNATIONAL EXHIBITION, 1881.

To His Excellency Sir J. R. Longden, K.C.M.G. Governor, &c., &c.

MELBOURNE INTERNATIONAL EXHIBITION, 1881.

Report.

We, the Committee appointed under Your Excellency's instructions dated 19th January, 1880, to secure the representation of Ceylon at the Melbourne International Exhibition, have the honour to report that our duties are now completed.

2. Although the time at our disposal for the collection, arrangement, and transmission of exhibits was limited to a very few months, we believe that the natural and artificial products, which form the chief sources of the wealth and industry of the colony, were fairly represented.

3. We annex for record a copy of the Catalogue of Exhibits. The value of this catalogue was much increased by the notes, statistics of commerce, and epitome of information regarding the colony, for which the Committee were indebted to Messrs. A. M. and J. Ferguson.

4. Your Excellency was pleased to approve of the appointment of Mr. A. M. Ferguson as Commissioner to represent the colony at Melbourne, and we are of opinion that the energy and ability displayed by him in that capacity attracted towards the exhibits of the Ceylon Court an attention which they would not otherwise have obtained. The endeavours of our Commissioner, in co-operation, wherever mutual interests were concerned, with the Indian and other Commissioners, to secure the introduction of Ceylon products, and especially tea, into the Australian market will, we confidently hope, result in substantial and permanent advantages to the colony. We shall be glad if Your Excellency will consent to express to Mr. Ferguson the thanks of the colony for his services.

5. About 800 exhibits were sent by 78 contributors, not including the interesting collections, containing over 500 specimens, forwarded by the Government Agent of the Northern Province (illustrating the products and uses of the palmyrah palm); Dr. Trimen (exhibits from the Royal Botanical Gardens, Peradeniya): and Mr. Dixon (Geographical and Mineralogical specimens). Messrs. Leechman also sent a very complete collection of exhibits, illustrating the uses of the cocoanut palm.

6. We annex a copy of the list of awards assigned to Ceylon exhibitors. There were awarded to the Colony:—

Gold Medals	...	3	First Certificate of Merit	...	2
Silver Medals	...	21	Second Certificate of Merit	...	26
Bronze Medals	...	4	Third Certificate of Merit	...	53
Diplomas	..	3	Fourth Certificate of Merit	...	17
Certificate equal to Silver Medal		1	Fifth Certificate of Merit	...	7
Honorable Mention	...	11			

Of these awards there were assigned:—.

For Teas:—		
Silver Medals	...	11
Certificates	...	24
For Coffee:—		
Silver Medals	...	7
Certificates	...	5
For Cinnamon:—		
Bronze Medals	...	2
Certificates	...	2
For Cinchona Bark:—		
Certificates	...	4
For Fibres:—		
Silver Medal	...	1
Certificates	...	2
For Oils:—		
Silver Medal	...	1
Certificates	..	4
For Plumbago:—		
Certificates	...	4
For Gold & Silver Work & Jewellery:—		
Certificates	...	12
Honorable Mention	...	1
For Fancy Work:—		
Bronze Medal	...	1
Certificates	...	10
For Lace:—		
Certificates	...	4

MELBOURNE INTERNATIONAL EXHIBITION, 1881.

REPORT.

7. The payments made by us on account of the Exhibition amounted to Rs. 28,057—55, the details of which are shown in the statements annexed. Deducting the sum of Rs. 7,286—64 paid to exhibitors for goods sold, the cost of the representation of Ceylon at Melbourne amounted to Rs. 20,770—91. Of this sum Rs. 14,170—38 were spent in Melbourne and Rs. 6,600—53 in Ceylon.

8. We shall forward to the Hon. the Colonial Secretary for record our files of correspondence, minutes of our meetings, and detailed accounts of expenditure.

Colombo, 30th November, 1881.

F. R. SAUNDERS.
F. M. MACKWOOD.
CHAS. BRUCE.

*Enclosures.**

1.—Copy of Catalogue of Exhibits.
2.—List of Awards to Ceylon Exhibitors.
3.—Balance Sheet.
4.—Account Current with Government.
5.—Statement of Expenditure at Melbourne.

* Not printed.

XXXII.—1881.

COLONIAL STEAMER "SERENDIB."

RETURN to an Order of the LEGISLATIVE COUNCIL of CEYLON, dated 30th November, 1881.

"That a Return be furnished showing the original cost of the Steamer "Serendib;" the number of times she has been repaired, together with the cost of such repairs; of all other sums expended annually on account of her maintenance and outfit; also for a Return showing her annual earnings since purchase by this Colony."

(The Hon. F. M. Mackwood.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

COLONIAL STEAMER "SERENDIB."

COLONIAL STEAMER "SERENDIB."

STATEMENT OF COST AND MAINTENANCE.

RETURN showing the original cost of the S. S. "Serendib," the number of times she was repaired, the cost of such repairs, and the amount annually expended on account of maintenance and outfit, together with her annual earnings since purchase by the Colony.

Date.	Original Cost.	No. of times repaired, and cost of repairs.		Cost of Maintenance and Outfit.		Earnings.	
		Rs.	cts.	Rs	cts.	Rs.	cts.
1870 & 1871 ...	£18,143 11*s.* 4*d.* @ 1/10½ = Rs. 193,531—37 (Includes a sum of £293 11*s.* 4*d.* inspecting charge.)	—		—		—	
1871 ...	—	—		69,549	23	8,599	13
1872 ...	—	—		48,468	24	40,559	56½
1873 ...	—	—		71,331	31	48,396	10½
1874 ...	—	—		72,276	52	40,781	34½
1875 ...	—	1st	20,975	53,992	17	4,106	2
1876 ...	—		62,446	91,102	75	52,814	7
1877 ...	—	2nd	27,118	68,441	69	38,219	27
1878 ...	—		760	86,166	18	66,448	45
1879 ...	—	—		87,443	34	76,079	7
1880 ...	—	3rd	29,875	72,912	11	78,185	84
1881 ...	—		65,539	49,339	83*	14,943	58†
	Rs. 193,531	37	206,715	13	771,023	37	469,132	44½

* From January to October, 1881.
† From July to September, 1881 (five voyages.)

Audit Office,
Colombo, 3rd December, 1881.

W. H. RAVENSCROFT,
Auditor-General.

XXXIII.—1881.

STAMP ORDINANCES AMENDMENT BILL.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bill intituled "An Ordinance to amend the Ordinance No. 8 of 1863 and the Ordinance No. 3 of 1865."

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of the Legislative Council, dated 16th November, 1881.

Resolved, —That the following gentlemen be appointed a Sub-Committee to report upon the Bill intituled:

"An Ordinance to amend the Ordinance No. 8 of 1863 and the Ordinance No. 3 of 1865."

The Hon. B. L. BURNSIDE, Queen's Advocate.
The Hon. G. VANE, Treasurer.
The Hon. F. R. SAUNDERS, Government Agent, Western Province.
The Hon. J. VANLANGENBERG,
The Hon. P. RÁMA-NÁTHAN,
The Hon. W. W. MITCHELL,
} Unofficial Members.

STAMP ORDINANCES AMENDMENT BILL.

REPORT.

THE Sub-Committee to whom was referred "The Ordinance to amend the Ordinance No. 8 of 1863 and the Ordinance No. 3 of 1865," recommend the Council to adopt the amendments which they have made, appearing in the Draft thereof reprinted herewith.

B. L. BURNSIDE.
G. VANE.
F. R. SAUNDERS.
J. VANLANGENBERG.
P. RAMA-NATHAN.
W. W. MITCHELL.

Legislative Council Chamber,
Colombo, 5th December, 1881.

XXXIV.—1881.

ECCLESIASTICAL SUBSIDIES BILLS.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bills intituled "An Ordinance to amend the Ordinance No. 1 of 1870, intituled 'An Ordinance relating to the Fixed Civil Establishments of this Colony,'" and "An Ordinance for the appointment of Incorporated Trustees of the Church of England in Ceylon."

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of the Legislative Council, dated 30th November, 1881.

Resolved,—That the following gentlemen be appointed a Sub-Committee to report upon the Bills intituled :

"An Ordinance to amend the Ordinance No. 1 of 1870, intituled 'An Ordinance relating to the Fixed Civil Establishments of this Colony,'" and "An Ordinance for the appointment of Incorporated Trustees of the Church of England in Ceylon."

The Hon. J. DOUGLAS, Colonial Secretary.
The Hon. B. L. BURNSIDE, Queen's Advocate.
The Hon. W. H. RAVENSCROFT, Auditor-General.
The Hon. F. M. MACKWOOD, }
The Hon. W. W. MITCHELL, } Unofficial Members.
The Hon. A. L. De ALWIS, }

ECCLESIASTICAL SUBSIDIES BILLS.

REPORT.

ECCLESIASTICAL SUBSIDIES BILLS.

REPORT.

THE Sub-Committee appointed by the Legislative Council to report upon "An Ordinance to amend the Ordinance No. 1 of 1870, intituled 'An Ordinance relating to the Fixed Civil Establishments of this Colony,'" and "An Ordinance for the appointment of Incorporated Trustees of the Church of England in Ceylon," have given their careful consideration to the provisions contained in these two measures, with regard to the first-mentioned of which they have no observations to offer.

Upon consideration of the provisions of the Ordinance for the appointment of Incorporated Trustees, it was moved by the Hon. W. W. Mitchell to insert in the 21st line of the preamble the word "certain" between the words "meeting of" and "clerical." The motion being opposed, was lost upon a division, the votes being as under:—

For.	*Against.*
The Hon. F. M. Mackwood.	The Hon. the Colonial Secretary.
The Hon. W. W. Mitchell.	The Hon. the Queen's Advocate.
	The Hon. the Auditor-General.
	The Hon. A. L. De Alwis.

It is recommended that the Christian names of the four Trustees proposed to be appointed by clause 1 of this Ordinance be given in full in the clause.

Upon a motion by the Colonial Secretary to add to the 3rd clause, at its end, the following proviso :—"Provided that until such governing body is appointed, the Trustees shall exercise all the rights, powers, and control by this clause conveyed to them subject to the sanction of the Bishop of Colombo"—a division was taken, and the motion was carried, the votes being as under :—

For.	*Against.*
The Hon. the Colonial Secretary.	The Hon. F. M. Mackwood.
The Hon. the Queen's Advocate.	The Hon. W. W. Mitchell.
The Hon. the Auditor-General.	
The Hon. A. L. De Alwis.	

And a motion to omit the concluding words of the Ordinance, "as shall from time to time be sanctioned by the Bishop of Colombo," was negatived upon a division, the votes being as under :—

For.	*Against.*
The Hon. W. W. Mitchell.	The Hon. the Colonial Secretary.
The Hon. F. M. Mackwood.	The Hon. the Queen's Advocate.
	The Hon. the Auditor-General.
	The Hon. A. L. De Alwis.

J. DOUGLAS.
B. L. BURNSIDE.
W. H. RAVENSCROFT.
F. M. MACKWOOD.
W. W. MITCHELL.
A. L. DE ALWIS.

Legislative Council Chamber,
Colombo, 6th December, 1881.

XXXV.—1881.

ESTATES MEDICAL WANTS BILL.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bill intituled "An Ordinance to amend the Medical Wants Ordinance, 1880."

Ordered by the Legislative Council to be Printed.

COLOMBO.
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of the Legislative Council, dated 23rd November, 1881.

Resolved,—That the following gentlemen be appointed a Sub-Committee to report upon the Bills intituled :

"An Ordinance to amend the Medical Wants Ordinance, 1880."

The Hon. J. DOUGLAS, Colonial Secretary.
The Hon. B. L. BURNSIDE, Queen's Advocate.
The Hon. F. B. TEMPLER, Government Agent, Central Province.
The Hon. P. RÁMA-NÁTHAN, } Unofficial Members.
The Hon. W. W. MITCHELL, } Unofficial Members.
The Hon. J. L. SHAND, } Unofficial Members.

ESTATES MEDICAL WANTS BILL.

REPORT.

THE Sub-Committee appointed by the Legislative Council to consider the Draft of an Ordinance intituled "An Ordinance to amend the Medical Wants Ordinance, 1880," have the honour to report as follows :—

The Sub-Committee have considered the question whether the tax leviable under clause 5 should be levied upon all the labourers on an estate or upon those only who are borne upon the check-roll, and see no alternative but to follow the first-mentioned system, as proposed in the Draft Ordinance, inasmuch as the check-roll could easily, and undoubtedly would be, largely evaded by an extension of the contract system. There is, moreover, no provision in any Act of the Legislature by which a check-roll is recognised or regulated.

In this connection the attention of the Sub-Committee has also been directed to a suggestion that the tax should be rated upon the wages earned by the labourers on estates rather than upon the number of labourers ; but in the absence of any authoritative expression of opinion on the part of the Planting Community in favour of such an alternative measure, the Sub-Committee have not felt justified in suggesting any departure from the terms of the reference made to them by the Council. The scope of this reference is by the Council limited to a capitation tax, and is, moreover, in accordance with the instructions of the Secretary of State.

The Sub-Committee recommend the transposition of the penalties attached by clauses 11 and 15 for obstruction and for making false returns, as it appears to them that the latter is the graver offence and should therefore be visited with heavier punishment. The other alterations suggested affect matters of detail only, and will be found in the amended draft of the Ordinance, which is enclosed.

The absence of the signatures of the Unofficial Members of the Sub-Committee is explained by the Protest which has been handed in by them, and which is appended to this report.

J. DOUGLAS
B. L. BURNSIDE.
F. B. TEMPLER.

Legislative Council Chamber,
Colombo, 10th December, 1881.

PROTEST.

WE desire it to be stated in the report that we consider it altogether wrong and impracticable to create the special fund intended to be raised for the purposes of this Ordinance under clause 5 by a capitation tax, and we cannot acquiesce in any of the provisions of the Ordinance in consequence.

J. L. SHAND.
W. W. MITCHELL.
P. RA'MA-NA'THAN.

XXXVI.—1881.

SUPPLEMENTARY SUPPLY BILL, 1881.

REPORT of a SUB-COMMITTEE of the LEGISLATIVE COUNCIL appointed to report upon the Bill intituled "An Ordinance for making provision for the Supplementary Contingent Charges for the year 1881."

Ordered by the Legislative Council to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

EXTRACT from the Minutes of the Legislative Council, dated 30th November, 1881.

Resolved,—That the following gentlemen be appointed a Sub-Committee to report upon the Bill intituled:

"An Ordinance for making provision for the Supplementary Contingent Charges for the year 1881."

The Hon. J. DOUGLAS, Colonial Secretary.
The Hon. W. H. RAVENSCROFT, Auditor-General.
The Hon. W. HALLILEY, Acting Principal Collector of Customs.
The Hon. P. RÁMA-NÁTHAN, }
The Hon. F. M. MACKWOOD, } Unofficial Members.
The Hon. A. L. DE ALWIS, }

SUPPLEMENTARY SUPPLY BILL, 1881.

THE Sub-Committee appointed to report upon "An Ordinance for making provision for the Supplementary Contingent Charges for the year 1881" have the honour to report as follows:

No. 1.—ESTABLISHMENTS.

I.—CIVIL.

SECRETARIAT.

Printing Branch. - Contingencies.

Rs. 500.—The expenditure in the Printing Office has so frequently exceeded the vote that the Sub-Committee recommend with the view of reducing printing expenses, that the statistical papers which usually appear in the Administration Reports should in future be collated, and that such statistics as may already be included in the Blue Book or may be judged to be unnecessary should be omitted.

AUDIT OFFICE.

The vote of Rs. 552—38 for extra work is not properly chargeable to the Audit Department, and as it has been provided elsewhere this item may be struck off.

PROVINCIAL AGENCIES

Some of these votes have been necessitated by the introduction of the "Grain Tax Ordinance, 1878." The item of Rs. 7,000 for pay of the Medical Inspector, Coffee Districts, had been omitted from the Supply Bill, 1881, in anticipation of the new Ordinance coming into operation at an earlier date than has been found practicable.

HARBOUR DEPARTMENT

Augmented salaries of two European pilots, Rs. 600. - The re-arrangement of the Department consequent on the abolition of the post of Assistant Master Attendant, whose duties devolve on the two senior European pilots, in addition to their own, which are every day becoming more important as Colombo is visited by more Mail Steamers, justifies this measure.

V.—MEDICAL.

In order to secure recognition by the Council of Medical Education in England of the diplomas granted at the Ceylon Medical College, it was found necessary to appoint three additional lecturers for the students, and the Sub-Committee have much pleasure in recommending that this vote of Rs. 999—84 cents be passed for this purpose.

SERVICES, EXCLUSIVE OF ESTABLISHMENTS.

No. 2.—PENSIONS, RETIRED ALLOWANCES, AND GRATUITIES.

For many years prior to 1880 the sums voted under this head were in excess of the actual requirements of the Colony, and it has been explained to the Sub-Committee that in an attempt to reduce the vote for 1881 to the lowest possible amount, a provision was made which now appears to be insufficient.

Under these circumstances, the Sub-Committee consider this additional vote of Rs. 25,000 to be necessary.

No 3.—REVENUE SERVICES.

SALT.

The three years preceding 1881 were found to be very unfavourable for the manufacture of salt, and a part of the sums voted during those years was consequently not expended. A very large salt harvest has been gathered during the present year, to pay for which

SUPPLEMENTARY SUPPLY BILL, 1881.

REPORT.

additional funds are required. To supplement the local supply it was also found necessary to import salt from India, for which very favourable terms were granted by the Madras Government. At present the Government has a large supply of salt secured and in course of removal to the stores.

PEARL FISHERY.

The expenses of the pearl fishery exceeded the sum anticipated by Rs. 5,000, but the receipts were found to be Rs. 259,000 in excess of the estimates, making one of the most successful pearl fisheries on record.

No. 4.—ADMINISTRATION OF JUSTICE.

REGISTRAR, SUPREME COURT.

Rs. 7,500.—This vote was found to be necessary owing partly to the increased length of the criminal sessions and partly to the extraordinary sessions of the Supreme Court at Ratnapura and Mátalé.

FISCALS.

It is recommended that a sum of Rs. 500 be added to the sum placed in the Estimates for the Fiscal of the Western Province, and that the vote of Rs. 200 for examinations by medical practitioners to the Fiscal of the North-Western Province be increased to Rs. 400. The vote for Rs. 21,100 to the Fiscal of the Central Province is required in consequence of the heavy calendar which necessitated extremely protracted assizes of the Supreme Court in this Province.

No. 8.—HOSPITALS AND SANITATION.

It is recommended that a sum of Rs. 1,000 be added to this vote for the purpose of procuring disinfectants for the Northern Province, as there is reason to apprehend from the prevalence of the disease in Southern India a possible visitation of cholera in that Province.

No. 9 A.—POLICE SERVICES.

The sum of Rs. 26,632 required for arms and ammunition is rendered necessary in consequence of the failure of the Police Department to debit this sum against last year's funds, to which it was properly chargeable.

No 9 B.—PRISON SERVICES

The increased number of convicts has necessitated the vote for Rs. 25,000 in favour of the Superintendent of the Colombo Convict Establishments.

No. 14.—ROADS, STREETS, BRIDGES, AND CANALS.

New Roads.—It is recommended to increase the vote under this head by Rs. 16,286 for compensation for land taken for the Lorne road.

Miscellaneous.—It is recommended that a sum of Rs. 1,500 for relief works in the Puttalam District be added to this vote in order to repay an advance for that purpose made last year.

No. 17.—COLONIAL STORE.

Stationery, Rs. 60,000.—This vote is required for the stationery which was ordered out to replace that supposed to have been lost with the steamer "Penguin," which met with an accident in the Suez Canal.

No. 19.—GOVERNMENT VESSELS.

It is recommended that the vote under this head should be increased by Rs. 29,875 – 25, which represents the cost of supplying and placing in the steamer "Serendib" a new boiler from England

The Sub-Committee wish to record their opinion that the regular conveyance of goods, mails, and passengers to and from the sea-ports on the coast of the Island at a less cost to the colony than is at present incurred by the working of the Colonial Steamer "Serendib," is a question which deserves the serious attention of the Council and of the Government.

J. DOUGLAS.
W. H. RAVENSCROFT.
W. HALLILEY.
P. RA'MA-NA'THAN.
F. M. MACKWOOD.
A. DE ALWIS.

Legislative Council Chamber,
Colombo, 14th December, 1881.

XXXVII.—1881.

FURTHER CORRESPONDENCE

ON THE SUBJECT OF

ECCLESIASTICAL MATTERS IN CEYLON.

(In continuation of Sessional Paper No. XXXIV. of 1881.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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FURTHER CORRESPONDENCE

ON THE SUBJECT OF

ECCLESIASTICAL MATTERS IN CEYLON.

No. 1.

The LORD BISHOP OF COLOMBO to Governor Sir J. R. LONGDEN, K.C.M.G.

No. 76. Colombo, 2nd July, 1881.

SIR,—I HAVE the honour to ask that the Hon. the Queen's Advocate may be instructed to give an opinion on the questions submitted herewith.

I have, &c.,
R. S. COLOMBO.

Enclosure in No. 1.—*Questions referred to.*

1. Whether in consequence of the proposed abolition of State Subsidies to the Church of England in Ceylon, the Letters Patent of the present Bishop will be recalled?
2. Whether, if they are not recalled, it is in his power to surrender them?
3. Whether, as long as he retains them, they will continue to have the same legal effect on him and on others as they at present have?

No. 2.

The Hon. the COLONIAL SECRETARY to the Hon. the QUEEN'S ADVOCATE.

No. 425. Colombo, 9th July, 1881.

SIR,—I AM directed to transmit the accompanying copy of a letter from the Bishop of Colombo for your opinion and advice; and to enquire whether the questions put by him are of such a nature as you can legitimately advise upon.

I have, &c.,
J. A. SWETTENHAM,
for Colonial Secretary.

No. 3.

The Hon. the QUEEN'S ADVOCATE to the Hon. the COLONIAL SECRETARY.

Queen's Advocate's Office,
No. 396. 11th July, 1881.

SIR,—I HAVE to acknowledge the receipt of your No. 425, with enclosures from the Bishop of Colombo, requesting my opinion as to whether I can legitimately advise upon the questions submitted by the Bishop. In reply I have the honour to advise:

1. The questions are not such as the Queen's Advocate should be called on for the present to express an opinion upon.
2. The first question involves no legal principle, but is a mere question of fact dependent on Imperial policy, of which I am in no position to express an opinion.
3. The two other questions are entirely dependent on the first, and can only arise after the solution of the first.

I have, &c.,
B. L. BURNSIDE,
Queen's Advocate.

ECCLESIASTICAL MATTERS

FURTHER CORRESPONDENCE.

No. 4.

Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G., to the LORD BISHOP OF COLOMBO.

Queen's House,
Colombo, 18th July, 1881.

MY LORD,—WITH reference to your letter of the 2nd instant, No. 76, requesting that the opinion of the Queen's Advocate may be obtained on certain questions submitted by you, I have the honour to state that the officer is of opinion that the questions are not such as he should be called on for the present to express an opinion upon.

2. The questions will, should you desire it, be submitted to the Secretary of State.

I have, &c.,
J. DOUGLAS.

No. 5

The LORD BISHOP OF COLOMBO to Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G.

Badulla, 12th August, 1881.

SIR,—IN reference to your letter of July 18th, I have the honour to ask, in accordance with your Excellency's permission, that the questions proposed by me be submitted to the Secretary of State.

I have &c.,
R. S. COLOMBO.

No. 6.

Lieutenant-Governor the Hon. J. DOUGLAS, C.M.G., to the Right Hon. the EARL of KIMBERLEY.

Queen's House, Colombo.
No. 231.—*Miscellaneous.* 19th August, 1881.

MY LORD,—I HAVE been requested by the Bishop of Colombo to solicit the views of Her Majesty's Government upon the three points enumerated in the letter of which I enclose a copy. That letter solicited the opinion of the local Crown Law Officers upon the several questions, but the Queen's Advocate did not feel in a position to express any opinion upon them, as being questions of fact dependent upon Imperial policy: they have, however, assumed some prominence in view of the impending disestablishment of the Church in Ceylon.

I may mention for your lordship's information that, at a preliminary Church meeting held in the course of last month, Trustees were elected for the purpose of taking over from Government such Church Temporalities as fall within the intention of your despatch No. 174 of 19th November last; and that a Committee of Clergy and Laymen were appointed to prepare a scheme for the future Government of the Church of England in Ceylon. The question whether the Letters Patent of the present Bishop will be recalled, or, failing such recall, it is in his power to surrender them, is one of considerable importance in reference to the action of this Committee, inasmuch as the terms of those Letters Patent subordinate, in certain respects, the See of Colombo to the Metropolitan Bishopric of Calcutta, and constitute it a portion of the Episcopal Province of India. On the other hand, the strong desire of the majority of churchmen in this colony is to consolidate the allegiance of the local Church to the Church of England, and to acknowledge no intermediary authority between itself and the Mother Church at home.

It is therefore with a view to removing any doubt as to the future relations of his See with the diocese of Calcutta, and of obviating any conflict of authority, that the Bishop solicits the information which it will, I trust, be in your lordship's power to accord to him.

I have, &c.,
J. DOUGLAS.

No. 7.

The Right Hon. the EARL of KIMBERLEY to Governor Sir J. R. LONGDEN, K.C.M.G.

Downing-street, London,
No. 333.—*Ceylon.* 17th October, 1881.

SIR,—I HAVE had under my consideration Mr. Douglas's despatch No. 231 of the 19th of August, submitting three questions put by the Bishop of Colombo with regard to his Letters Patent.

In reply to the first question, I have to state that it is not my intention to advise Her Majesty to revoke the Letters Patent appointing him to the See of Colombo, although in the event of a vacancy in the See I should not advise Her Majesty to make any fresh appointment to the See by Letters Patent.

With regard to the second question, I am not prepared to say whether it is in the Bishop's power to surrender his Letters Patent. I should, however, point out that he was consecrated under the accompanying form of license before the issue of his Letters Patent, which he did not receive until after his arrival in the colony. These Letters Patent provide for his resignation of the See, and it will be for him to consider whether he will act upon that provision and rely simply upon the license for his consecration.

With regard to the third question, I have to state that, as long as he retains the See under his Letters Patent, they will continue to have the same legal effect on him and on other persons which they at present have.

I have, &c.,
KIMBERLEY.

Enclosure in No. 7.

Draft of a Mandate to be passed under the Royal Sign-Manual and Signet for the Consecration of a Bishop.

Dated , 187

VICTORIA, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith To the Most Reverend Father in God, Archibald Campbell, by Divine Providence Lord Archbishop of Canterbury, Primate of all England, and Metropolitan : Greeting,

WHEREAS you the said Archbishop have humbly applied to Us for Our Licence by Warrant, under Our Sign-Manual and Signet, authorizing and empowering you to Consecrate Our Trusty and Well-beloved

Master of Arts, to be a Bishop, to the intent that he should exercise his functions in one of Our Possessions abroad Now it is Our Will and Pleasure, and We do by this Our Licence under Our Sign-Manual and Signet, authorize and empower you the said Archbishop to Consecrate the said

to be a Bishop, and We do further authorize and empower you to do, perform, and execute all and singular those things which belong to your pastoral office in respect of such Consecration as aforesaid, according to the Laws, Statutes, and Canons in this behalf made and provided

Given at Our Court at , this day of , 187 , in the thirty- year of Our Reign

By Her Majesty's command.

Superscribed.

To the Most Reverend Father in God, Archibald Campbell, Lord Archbishop of Canterbury, Primate of all England, and Metropolitan, and to all Bishops herein concerned.

No. 8.

Governor Sir J. R. LONGDEN, K.C.M.G. to the LORD BISHOP OF COLOMBO.

No. 333. Colombo, 18th November, 1881.

MY LORD,—WITH reference to my letter of the 18th July last, I have the honour to forward to you the accompanying copy of a despatch from the Secretary of State, and to state that it is proposed to lay it before the Legislative Council as a Sessional Paper, together with the correspondence which led to it, if your lordship sees no objection.

I have, &c.,
J. R. LONGDEN.

No. 9.

The LORD BISHOP OF COLOMBO to Governor Sir J. R. LONGDEN, K.C.M.G.

No. 134. Colombo, November 19th, 1881.

SIR,—I HAVE the honour to acknowledge your Excellency's letter of the 18th instant in reference to certain questions submitted by me with regard to my Letters Patent. In view of the correspondence becoming public—to which I have no objection whatever to offer—I would beg to be allowed, in order to prevent a possible misconception of my purpose in asking those questions, to remark that I have no intention of acting on the provision referred to by the Secretary of State in the second paragraph of his lordship's despatch, but purpose, God willing, to retain the See under my Letters Patent.

I have, &c.,
R. S. COLOMBO.

XXXVIII.—1881.

LAW RELATING TO CONTRACTS AND TORTS.

RETURN to an Order of the LEGISLATIVE COUNCIL OF CEYLON, dated the 14th December, 1881.

"That Papers be furnished touching the proposed measure for substituting English Law instead of Roman Dutch Law in relation to Contracts, and the Law of Torts and Damages."

(The Hon. W. W. Mitchell.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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LAW RELATING TO CONTRACTS AND TORTS.

No. 1.

The LAW OFFICERS OF THE CROWN to the Hon. the COLONIAL SECRETARY.

No. 572.

Queen's Advocate's Office,
Colombo, 26th September, 1881.

SIR,—As Law Officers of the Crown, we have had under consideration the state of the existing law in respect of Contracts and Torts, and have come to the conclusion that the time has arrived for the introduction into this colony of the English law relating to these subjects.

2. The law now in force is the Roman-Dutch Law, which we consider to be quite unsuited to the present exigencies of trade. This law is, besides, difficult of access by reason of its being found mainly in text books in the Dutch and Latin languages. It has ceased to be the Law of Holland, from which this Island derived it, and there is the further disadvantage arising from the absence of precedents for guidance in the many questions that arise from this almost obsolete system of jurisprudence.

3. In the year 1846 the English Law of Evidence was first introduced here by the Ordinance No. 3 of 1846, supplemented afterwards by the Ordinance No. 9 of 1852.

4. In the year 1852 the Law of England was further introduced by Ordinance No. 5 of 1852, in respect of all maritime matters and in respect of bills of exchange, promissory notes, and cheques.

5. In the year 1866 this law was further extended to the following commercial matters, viz., to partnerships, joint stock companies, corporations, banks and banking, principals and agents, carriers by land, and life and fire insurances. We cannot understand why other contracts, such as the buying and selling of goods, bailments, suretyship, guarantees, and others equally affecting commercial and general interests, should hitherto have been excluded from the operation of the English Law, the more so as we find on reference to the Treaty on the Capitulation of Colombo of 15th February, 1796 (article 23), that the Law of England was to be observed in the decision of all civil suits then depending in the Council of Justice.

6. We beg to suggest the further introduction of the Law of England into this colony in certain Contracts and Torts; and to facilitate any movement in this direction we beg to forward the draft of an Ordinance* for the consideration and approval of the Government.

We are, &c.,
B. L. BURNSIDE,
Queen's Advocate.
CHAS. L. FERDINANDS,
Deputy Queen's Advocate.

No. 2.

H. E. the GOVERNOR to the Hon. the JUDGES of the Supreme Court.

Colombo, 12th October, 1881.

HON. SIRS,—I HAVE the honour to forward herewith for your information a copy of a draft Ordinance which it is intended to bring before the Legislative Council during the present session, and I have to request that you will favour me with any observations you may desire to offer on the proposed legislation.

I have, &c.,
J. R. LONGDEN.

No. 3.

The Hon. the SENIOR PUISNE JUSTICE to H. E. the Governor.

Colombo, 25th October, 1881.

HON. SIR,—I THANK you for forwarding to my learned colleagues and myself a copy of a draft "Ordinance further to introduce into the Colony the Law of England."

I welcome heartily the proposal to substitute the Law of England for the Roman-Dutch Law with respect to Contracts and Torts. Your Excellency, I believe, knows that

* This Draft, as subsequently amended by the Queen's Advocate, will be found on page 6.

LAW OF CONTRACTS AND TORTS.

CORRESPONDENCE.

while in England in 1879, I addressed a letter to the Secretary of State for the Colonies, in which I pointed out the mischief and the inconvenience inseparable from the present state of things. Each month of subsequent experience serves only to confirm the views I then expressed.

If it be conceded, as I trust it is, that the uncertainty and inconvenience arising from the retention of the Roman-Dutch Law as the ostensible Common Law of Ceylon demand a remedy, the question will perhaps be mooted, whether it may not be desirable to introduce in substitution a Code or Codes after the fashion of the Indian Law Codes. I certainly think that Ceylon might to her great advantage imitate India in the matter of Codes, and might even borrow largely from Indian Codes. But I augur from the frame of the draft Ordinance sent with your letter, that the Government of Ceylon think it better first to clear away the Roman-Dutch Law. I have nothing to say against that proposal. The present mischief and inconvenience are pressing, and I think it quite possible by an Ordinance of no great length to place the Law of England in the position now occupied by the Roman-Dutch Law, making some necessary reservations. The question of Codes might then be considered more at leisure.

I imagine that the draft Ordinance before me is intended to effect the purpose just mentioned, but I can hardly recommend it to the Legislature, because it seems to me defective as a means to that end. I do not of course wish to enter into verbal criticism; but the draft Ordinance seems to me to leave open a number of inconvenient doubts as to its precise intention and effect. I think that, on the principle *expressio unius est exclusio alterias*, difficulties would probably arise as to what matters of contract and tort the Ordinance really did embrace: and in other ways the draft Ordinance seems to me less explicit than it should be.

Undoubtedly, the framing of such an Ordinance is no easy task, and the best Ordinance which human skill can frame will need, when passed into law, careful and liberal handling in its construction; but it seems to me that the task is not an impossible one. I only fear that the draft now before me will, if passed into law, fail of the desired end.

I am, &c.,
L. B. CLARENCE,
Senior Puisne Justice.

No. 4.

The Hon. the CHIEF JUSTICE and the Hon. the JUNIOR PUISNE JUSTICE to H. E. the Governor.

Colombo, 3rd November, 1881.

SIR,—IN reply to your Excellency's letter of the 12th instant, forwarding the draft of "An Ordinance further to introduce into the Colony the Law of England," for any observations we may have to offer, we have the honour to state that we are of opinion that it would be advantageous to introduce into this colony the Law of England in certain matters more extensively than it now prevails; but a proposal to sweep away in one short enactment the great bulk of the Law of the Island, with regard both to contracts and torts, and to substitute for it a large mass of English, Common and Statute Law (a great part of the latter having been enacted without any reference to a state of things such as we find in Ceylon) is a matter that will require careful consideration.

We apprehend that the grounds for the proposed change are these:—

(1) That it is expedient that the laws which may often have to be applied to dealings between persons in England and persons in Ceylon should be the same in both countries:

(2) That the Judges, who administer the law here, should be able to avail themselves more widely than at present of the assistance and guidance of the decisions of the Superior Courts of England: and

(3) That the Law of England in the matters in which it is proposed to introduce it is *per se* a better law for the people of this Island than the existing local law.

The third of the above reasons for altering the law depends upon political or social rather than legal considerations. A full discussion of such considerations would be impossible within the limits of this letter; and we shall confine our attention to some of the legal aspects and consequences of the Ordinance, and refrain from discussing the policy of any particular law which it is proposed to alter.

As to the first and second of the above assumed reasons for the proposed Ordinance, we think that they are well-grounded and deserving of much weight; and a measure for introducing the Law of England in all such matters as are likely to give rise to a conflict between the respective laws of the two countries would, in our opinion, be decidedly advantageous. We are also fully impressed with the great benefit which would be gained, if the Judges were able to avail themselves to a further extent than at present of the precedents of the English Courts for their guidance and assistance.

It will thus be seen that we approve of the policy of the Bill generally, but it appears to us to go too far. It not only deals with a number of subjects as to which there is little prospect of any conflict of laws arising, but it introduces changes so extensive that there would be some danger of the administration of the Law being thrown into considerable confusion until the system became familiar to the people and to the practitioners.

The best way of further introducing the English Law here would, in our opinion, be to introduce it in a codified form, as it has, in a great measure, been introduced into India. This is a simple and effectual way, and the new law on any point is thus at once discovered and easily understood. To unprofessional Judges, especially, such as we have in Ceylon, there is no doubt that such Code would be of incalculable value.

If, however, it should be considered impracticable to codify such parts of the Law of England as it may be desirable to introduce here, we would suggest that the language of the enactment introducing the English Law on any subject should be limited, as far as possible, in such a way as to introduce nothing more than the *distinctive* law of that particular subject, and not to include by implication other branches of the law, which, though necessarily bearing upon the subject, have no special reference to that, more than to a variety of other subjects. Take, for instance, the law of guarantees. If the English law of guarantees were introduced generally and nothing more, and the question arose here, whether a married woman or a minor with letters of *venia ætatis* could enter into a binding guarantee, such a question would still be determinable by the Law of Ceylon; the question not being one arising out of the distinctive law of guarantees, but one depending upon the law of *status* and capacity to contract, a law which has the same bearing upon other kinds of contracts as upon guarantees. The present Ordinance, it will be seen, does more than introduce the English law of guarantee. It introduces also, as will be seen hereafter, the Law of England in questions relating to the capacity of a person to enter into such a contract, and also the procedure of the English Courts for enforcing or obtaining damages for breach of such a contract.

In a similar way, with regard to the other subjects dealt with by the Ordinance, it seems to us to be too general and comprehensive.

Turning to the details of the measure :—

Section I.

We would suggest that any Ordinance introducing extensive changes in the law should not come into operation until such day as the confirmation thereof by Her Majesty should be proclaimed in the *Gazette*. If such an Ordinance should be passed by the Legislative Council and should afterwards be disallowed by Her Majesty, great confusion might arise, for the result would be that all matters, to which the Ordinance applies, arising during the interval between its passing and disallowance, would be governed by a body of law which would not be applicable to matters arising at any other time; and whether any given case would have to be determined by the English Law or the existing Law of Ceylon would depend upon a date which it might be often very difficult, if possible, to ascertain with any certainty. Even though there may be no danger of the measure being disallowed, we should till think it desirable to postpone the operation of the enactment to some future date, in order that practitioners and others may become a little familiarized with, and prepared for, the change of law before it takes effect.

Section II.

For the words "save and except in the particulars in which the same may be repugnant to any local Ordinance," we would suggest the words "save and except where any special provision is made in respect thereof by any local Ordinance." There may be (and indeed are) many matters which are provided for by local Ordinances, and which also form the subject of English statutes. It is quite possible that the Ceylon enactment and the English enactment may each prescribe some course to be followed, and that the respective provisions, though different, may not be in any way repugnant one to the other. It would be very inconvenient to have two different enactments relating to the same state of things running side by side; so that a person concerned in some matter within the purview of the two enactments would have to consider, first, whether the provisions were repugnant *inter se* or merely cumulative (not always an easy thing to determine), and, if the latter, would have the burden thrown upon him of complying with the requirements of each.

Schedule A.

As the last paragraph stands it would appear that the enumeration of the different kinds of contracts has reference only to the provision for the remedies and compensation for breach, and not to the previous provisions of the schedule. We presume however, that the intention is that no contracts should fall under the Ordinance at all except the kinds expressly mentioned. This, however, should be made clear. The words "or illegal, immoral, void or voidable contracts," as connected with what precedes, are, no doubt, intended to introduce the Law of England as to illegality, immorality or voidability of contracts; but this does not appear to us to be expressed. As the clause stands, it would seem to

LAW OF CONTRACTS AND TORTS.

CORRESPONDENCE.

introduce the Law of England as to the remedies and compensation for breaches of illegal, immoral, void or voidable contracts. But, of course, there could be no remedies for the breach of illegal or void contracts.

The first matter to which the Ordinance applies is "the parties to" contracts. This, we apprehend, includes all questions arising as to the capacity of the parties to enter into binding contracts. This will introduce a great body of English law, which it will be very difficult to apply to Ceylon. For instance, how far under English Law can a married woman contract, who has been separated from her husband by a divorce *a mensâ et thoro* under the Roman-Dutch Law, a kind of divorce not now known to English Law? Or, what would be the capacity to contract under English Law of a minor, who had obtained letters of *venia ætatis* under the Roman-Dutch Law? These are merely illustrations (many other illustrations will at once occur to lawyers) of the difficulties which might attend the introduction of English Law in questions relating to "parties to contracts."

Next, as to the formation and "authentication" of contracts, we are not quite clear as to the full intent of the word "formation;" we apprehend, however, that by the words "formation" and "authentication" of contracts, it is intended to include all the incidents necessary for the making of a valid contract, such as capacity to contract, free consent, good consideration, &c., as well as to the formalities to be observed at the making of certain classes of written contracts. These provisions would make sealing a necessary solemnity in the execution of some instruments falling under the Ordinance. Sealing is at present little practised here, and has no special virtue as it has under English Law. We are afraid that many obligations would be evaded, if this new and unfamiliar formality were suddenly introduced.

With regard to the *transfer* of contracts, the Supreme Court of Judicature Act has assimilated the Law of England in a great measure to that of Ceylon, though not altogether. If it is thought that the English Law is a better law on this subject than the somewhat more elastic law prevailing here, we see no objection to the change.

With regard to the discharge and release of contracts, we consider the Law of Ceylon, which is based on the Civil Law, and which is similar, we believe, to that of most European countries, is, if anything, a better law than that of England, but the subject is too technical to be suitably discussed in this letter.

As to the "remedies for breach of contracts," we apprehend that this expression must be taken to include the procedure to enforce them or obtain damages for their breach. But to introduce the procedure of the English Courts into this Island, except by means of a regular Code of Rules and Orders, would be impracticable; and it would be very confusing to have one kind of procedure for cases falling under the Ordinance, and another kind of procedure for all other cases.

Schedule B.

This part of the schedule sweeps away the great bulk of the Law of the Land as to civil "wrongs," and introduces the Law of England in its place. The advisability or otherwise of an extensive change of this kind depends upon political or social rather than legal considerations. If the Common and Statute Law of England, which deals with the subjects mentioned in this part of the schedule, is a better law than that of Ceylon, where it differs from the Law of Ceylon, and more suited to the requirements of the people of this Island, the change would be properly made; but before it is made, each subject should be separately considered, with reference to the difference between the respective laws of the two countries, and to the superiority, as the case may be, of the one over the other. It would be impossible within the limits of this letter to discuss fully the various questions arising on this part of the schedule. The word "trespass" itself (including trespass to person, trespass to goods and trespass to land) has such an extensive signification in law, that it would take much time and thought to determine how much of the Roman-Dutch Law was swept away by the introduction of the English Common Law of Trespass and of all the English statutes bearing upon the subject.

Although we are in favour, as we have before observed, of extending the English Law in this Island, such extension should, we think, be somewhat gradual; and before any particular branch of English Law is introduced here, it should be fully considered with reference to the habits and requirements of the people, and also with reference to the effect of the change on other branches of the Law of the Island, which are not expressly dealt with.

The present measure appears to us to be too sweeping and comprehensive.

We regret that the absence of the Junior Puisne Justice on circuit has caused some delay in our replying to your Excellency's letter.

We have, &c.,

RICHARD CAYLEY,
Chief Justice.

H. DIAS,
Junior Puisne Justice.

No. 5.

The Hon. the QUEEN'S ADVOCATE to the Hon. the COLONIAL SECRETARY.

No. 726.

Queen's Advocate's Office,
Colombo, 7th December, 1881.

SIR,—I HAVE the honour to acknowledge the receipt of yours, No. 734 of the 7th instant, forwarding for my consideration copies of letters from the Supreme Court Judges, submitting their remarks on the draft Ordinance, which I proposed to be submitted to the Legislative Council, introducing in certain respects the Law of England into this colony.

I gather from the letters that, whilst the Judges are unanimous in opinion that the proposed change is a desirable one, they take exception to some of the details of the draft, and object to it generally on the ground that it is of too sweeping and comprehensive a nature.

With regard to the detailed objections, I may deal with them at once.

I perfectly concur in the suggestion, and I accept it as a decided improvement on the measure, that its operation should be suspended until a future date. The reasons given by the Judges for this are insuperable and convincing.

I cannot agree with the Judges as to the advantage of substituting certain words, which they suggest, for the words which I have employed. I must say, even at the risk of incurring a charge of obtuseness, that the words which I have used will have the very effect which the Judges are desirous of securing, whilst the words suggested by their lordships will lead to the inconvenience which they desire should be avoided.

It is precisely because I recognize the inconvenience which would result if a Colonial Ordinance and an Imperial Statute, both to the same effect, were allowed to exist together, that I would leave no doubt as to which was the service of the Law. In such an event, if the two Statutes were not repugnant, then, by the present wording of the proposed Ordinance, the Imperial Statute would prevail. If, however, the proposed words were substituted, then a Local Ordinance which was in entire consonance with an Imperial Statute would be conserved, although the Imperial Statute itself would exist as a part of the general law which had been introduced, and from which it would be impossible to disconnect it. It seems to me that the broad question, whether two laws are repugnant, is not a difficult one to decide, although there may be much difficulty as to how far, when there is no actual repugnancy, they may be construed together. It is this latter difficulty which would be avoided by the Ordinance as I have worded it; "two different enactments relating to the same state of things" would not run "side by side," because if they were repugnant the Colonial Ordinance would prevail; if they were not repugnant or if there was any doubt upon the point, then the Imperial Statute would be substituted and the difficulty of construing them together would not arise.

With regard to the general objection that the Ordinance is of too sweeping and comprehensive a nature, I agree with the Judges that it would be undoubtedly better to codify the Law; but I may ask, is that possible, at any rate within any reasonable time? Years and years have already gone by in which the present system has been permitted to exist against a consensus of opinion that it is wholly unfitted to the circumstances of the colony. From time to time, and at wide intervals, spasmodic efforts have been made to introduce English Law on particular subjects in the place of the confused and obscure system which prevailed.

In 1846 the English Law of Evidence was introduced *en bloc*. In 1852 by one short clause a vast body of English Law relating to bills of lading and "generally to all maritime matters" and to "bills of exchange, promissory notes, and cheques" was introduced. In 1866 the law of "partnership, joint stock companies, corporations, banks, and banking, principal and agents, carriers by land, life and fire insurance" was introduced in the general words which I have quoted, and I have never heard it urged against these measures, that they were too "comprehensive and sweeping," or that they threw the administration of the law into confusion. They are universally regarded as reforms which were essentially necessary, and which have introduced light where there was chaos and confusion.

Since 1866 the work of reform seems to have stood still.

The subjects which are referred to in the proposed Ordinance are so cognate to those which have been already introduced and become substantive law, that it becomes a matter of surprise how the one could have existed without the other; as a matter of fact, they have not. The courts, usurping the functions of the Legislature, whenever difficulties have arisen, have had no hesitation in rejecting the Roman-Dutch Law and deciding as if the English Law were actually in force. It is manifest that such a mode of administering justice must be attended with the most embarrassing uncertainty, dependent, as it must be, not on what the law really is, but on what the presiding judge may consider as most expedient for the occasion to reconcile two conflicting systems of law, and on which system of the two he may consider the best adapted to the circumstances of the case under adjudication.

That this has been the result is, I know, felt by the leading members of the Bar, to whom the uncertainty from this cause which attends litigation is as embarrassing as it is prejudicial to suitors.

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It seems to me therefore that the time has fully arrived when the merit of any change will be its comprehensiveness, in that, instead of unsettling the administration of the law, it would render certain that which is now uncertain and precarious.

It is worse than idle to tolerate a system of law universally acknowledged to be wholly unadapted to the requirements of the times, inaccessible and but little understood, the practical effect of which is simply to embarrass the administration of a better system.

Feeling as I do that the legislation which I propose will leave no doubt as to what law is really administered and will point to uniformity and exactness in the judicial interpretation of that law, I should fail in my duty did I not, notwithstanding any hesitation on the part of the Judges, press for its adoption.

The public and the legal profession demand, and will welcome it; and although at this late period of the session it would perhaps be inexpedient to ask the Legislature to enter upon the consideration of so important a measure, I venture to hope that it may find a place among the legal reforms which will engage its attention at its next session.

I am, &c.,
BRUCE L. BURNSIDE,
Queen's Advocate.

P.S.—I return the enclosures, and I have corrected the Draft A. in accordance with the suggestions which I have accepted.

A.

Draft of An Ordinance further to introduce into the Colony the Law of England.

WHEREAS it is expedient to introduce into the Colony the Law of England relating to the particular matters hereinafter mentioned: BE IT ENACTED BY THE GOVERNOR OF CEYLON, with the advice and consent of the Legislative Council thereof, as follows:—

1. This Ordinance shall come into operation from and after the day of next.

2. The law hereafter to be administered in respect of the matters mentioned in the schedules A. and B., save and except in the particulars in which the same may be repugnant to any local Ordinance, shall be the same as would be administered in England in like cases at the corresponding period of time, if any such matter were to be adjudicated upon in England Provided always that nothing herein contained shall be taken to alter or vary in any respect the law as to the tenure or conveyance or assurance of or succession to immoveable property or any estate, right, title, or interest therein.

3. Nothing herein contained shall affect any right, privilege, obligation, or liability which shall have been acquired, accrued or incurred, or any penalty, forfeiture or punishment incurred, or any investigation, legal proceeding, or remedy in respect of such right, privilege, obligation, liability, penalty, or forfeiture which may have existed or have been taken before the passing of this Ordinance.

SCHEDULE.

A.

CONTRACTS.

Illegal, immoral, void or voidable contracts.

The parties to, the formation, authentication, and interpretation of, contracts.

The transfer of contracts

The performance of contracts.

The discharge of contracts by payment, release, set off, or otherwise.

The remedies and compensation for breach of contracts, all such contracts being contracts or implied contracts or promises relating to buying, selling, or otherwise disposing of moveable property, or of bailment, suretyship, guarantee, warranty, indemnity.

B.

TORTS.

Being civil injuries: to wit, assault and battery, false imprisonment, malicious arrest, malicious prosecution, malicious abuse of legal process,

Trespass.

Injuries committed in the execution of legal process or of void or irregular process, and the responsibility of judges and ministerial officers of Courts or Justice, and the parties setting such process in motion.

Wrongful detainer or conversion of moveable property.

Fraudulent misrepresentation, deceit, concealment, or false pretences, nuisances, negligence, libel, slander.

The parties to any civil proceedings arising out of such injuries, and the defences thereto, and the remedies and compensation for such injuries.

XXXIX.—1881.

TRIGONOMETRICAL AND CADASTRAL SURVEY OF CEYLON.

RETURN to an Order of the LEGISLATIVE COUNCIL of CEYLON, dated the 21st December, 1881.

"That a Return showing when the Trigonometrical and Cadastral Survey of Ceylon were respectively commenced, and what progress has been made since their commencement, specifying in either case the Province and Districts, or parts thereof, of which such Surveys have been made.

(The Hon. P. Ráma-Náthan.)

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J A SKEEN, GOVERNMENT PRINTER, CEYLON.

1882.

TRIGONOMETRICAL AND CADASTRAL SURVEY.

THE cadastral survey of some portions of Ceylon was commenced by Captain Gosset R. E., in 1857. It includes a few villages in the Western Province north of Colombo, and the survey of the towns of Kandy, Mátalé, Gampola, Badulla, Negombo, Trincomalee and Puttalam, which were completed during the time Colonel Sim, R. E., was Surveyor-General—between the years 1858 and 1862.

In the Batticaloa District of the Eastern Province, a cadastral survey, specially authorized by Sir Henry Ward, was commenced in 1860 for the purposes of commutation, and considerable progress was made with it, when, owing to an ill-timed reduction of the Survey Department in 1862, the general survey of villages and paddy lands was almost suspended, the surveyors who were retained having had to attend chiefly to the survey of lands applied for, and encroachments on Crown lands. About 39,000 acres of paddy lands have been cadastrally surveyed and mapped in the Batticaloa District, exclusive of other extensive surveys.

In the Central Province a large portion of Dumbara was surveyed between the years 1859 and 1863, and mapped in a cadastral form ; and the Government Agent has continued to settle claims on these maps up to the present date.

Numerous villages in the Districts of Colombo, Kalutara, and Negombo have been almost completely surveyed and mapped in a cadastral form ; and nine villages immediately south of Colombo, containing 2,852 lots, the total extent of which is 3,818 acres, surveyed and mapped during the last ten years, could with a little examination and revision be easily got ready for registration purposes. All the estates in the new districts of Dimbula, Dikoya, and Maskeliya are cadastrally mapped, and all old and isolated surveys are being gradually incorporated and fixed on our general map. I regret that for want of time I am unable to furnish a more detailed statement of our cadastral surveys, but I trust that this will be sufficient for present requirements.

J. STODDART,
Acting Surveyor-General.

Colombo, 21st December, 1881.

RETURN showing the Progress that has been made in the Trigonometrical Survey of Ceylon since the Base Line was measured at Negombo by Captain Gosset, R.E., Surveyor-General, in 1857.

Provinces.	Number of principal Trigonometrical Stations	Number of Secondary and Minor Trigonometrical Stations	Total number of Stations.	Number of square Miles in Province.	Average number of square Miles for each Station	Remarks.
Central .	11	1,323	1,334	6,029	4½	A number of the principal and secondary stations in this Province were erected by Major-General Fraser, of the Quarter-Master General's Department, and used by him in his Topographical Survey of the hill-country, a map of which on a scale of one inch to a mile was published by John Arrowsmith, of London, in 1845. The minor triangulation goes on steadily, extending with the progress of the surveys.
Western .	13	621	634	3,456½	5½	Several of the principal stations in this Province were erected by Major-General Fraser, and used in the construction of his map of the Island published by Arrowsmith in 1862. A base line, 5·47160 miles in length, was measured at Negombo by Mr. John Winzer, under Captain Gosset's directions, in 1857, on which the whole triangulation of the Island is mainly dependent. The minor triangulation of the Province is being carried on steadily with other work.
Eastern ...	11	164	175	3,657½	21	The principal stations are fairly distributed over the Province, but the secondary and minor stations are chiefly confined to the maritime pattus of Batticaloa, and to a small portion of the country round Trincomalee. A base line, 5·6553 miles in length, was measured by Mr. J. J. Grinlinton, at Batticaloa, in 1859, which has been connected with the Negombo base line by a chain of principal triangles, and the computations which have since been made have proved that, without taking into account spherical excess, the measured agrees with the computed base to 5·0688 inches, being under one inch per mile of error.
Southern ...	12	565	577	1,980	3½	The maritime districts of this Province are fairly well triangulated, and the minor triangulation is being steadily carried on as the work advances into the interior.
North-Western.	—	238	238	3,024½	12¾	The secondary and minor triangulation of this Province is chiefly confined to Kurunégala and the surrounding country, a few of the more important stations having been fixed by observations from other principal stations. The maritime and Demala pattus are, on account of their flat and wooded nature, exceedingly difficult to triangulate, and with a view to surmounting this difficulty I have an Assistant at present engaged exploring the country north of Puttalam, in hopes that he may be able to select and clear a certain number of slightly elevated points on which towers and stages can be erected of sufficient height to overtop the forest and enable me to carry chains of triangles northward, to join the Indian triangulation at the Islands of Delft, Kachchitivu, and Rámeswaram, and eastward to Anurádhapura and Lake Kokkulai.
North-Central	3	74	77	4,046¾	52½	The Dágobas in Anurádhapura have been fixed by observations from principal stations, and it is proposed to explore the country between Anurádhapura and Mannár with the view of carrying a chain of triangles across it.
Northern ...	1	6	7	3,171	—	The seven stations in this Province are situated to the eastward of the North road, and my Assistant who is at present stationed in the Mullaittívu District is exploring and selecting points in the country between Lake Kokkulai and Elephant Pass for the construction of a chain of triangles to connect Jaffna and the Islands with the general triangulation.

General Remarks.—There is no record in this Office of any base line measurements having been made before 1857. Capt. Gosset, R.E., mentions in his "Record of Base Transactions" that an attempt was made some years before 1857 by some parties to measure the Negombo base line; but we have no record of or results deduced from such measurement. The only record I can find of General Fraser's trigonometrical operations is contained in a book of Captain Gallwey's, in which the observations are worked out from stations extending between Colombo and Trincomalee; but the distances obtained from these observations differ so materially from the results of more modern measurement and observations, that it has been found impossible to incorporate them with our present work. The Trigonometrical Survey of the Island has still to be extended over the country to the North of a line drawn from Chilaw to Anurádhapura, and on to Lake Kokkulai on the East coast, embracing an area of nearly 5,000 square miles, including the islands in Palk's Straits. As soon as the reconnaissance and selection of points to the North of the line referred to is sufficiently advanced, it is my intention to apply through this Government to the Government of India for the loan of one of the large instruments and apparatus used on their Great Trigonometrical Survey, with the view of taking the necessary observations for the extension of the Indian Arc to the South of Ceylon, and the completion of a quadrilateral chain of triangulation from Delft to Jaffna and Lake Kokkulai—Delft to Mannár, and Puttalam—and Puttalam to Lake Kokkulai.

Colombo, 21st December, 1881.

J. STODDART, Acting Surveyor-General.

XL.—1881.

CEYLON.

FINANCIAL STATEMENTS

LAID BEFORE THE LEGISLATIVE COUNCIL

DURING THE SESSION OF 1881.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1881.

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STATEMENT of the REVENUE and EXPENDITURE

REVENUE.

	Rs	cts.	Rs	cts.	£	s.	d.
ARREARS OF REVENUE	—		490482	8½	45982	13	11
CUSTOMS.							
Imports	2919487	55					
Royalty on Plumbago	51322	83					
Warehouse Rent	8570	86					
			2979381	24	279316	19	10
PORT AND HARBOUR DUES.							
Port Clearances	98872	84					
Boats and Moorings	1456	75					
Pilotage	30775	0					
			131104	59	12291	1	1½
LAND SALES.							
Waste Lands	508214	87					
Cinnamon Gardens, &c.	—						
			508214	87	47645	2	10
LAND REVENUE.							
Paddy	774561	77					
Fine Grain	82221	4					
Gardens	13295	59					
Tythes redeemed	3737	12					
Rent of Lands	9896	85½					
Royalty on Cabook, &c.	414	15					
Licenses on Plumbago	2116	22					
Cinnamon	264	25					
Sundries	383	48					
			886890	47½	83145	19	8
RENTS, EXCLUSIVE OF LANDS.							
Bridges, Canals, &c.	346273	38					
Government Buildings and Houses	42717	66					
			388991	4	36467	18	2½
LICENSES.							
Arrack, Rum, and Toddy	1638970	28					
Stills	7830	0					
Wholesale Dealers in Arrack and Rum	1860	0					
Opium	4400	0					
Chanks	4189	45					
Royalty on Elephants	2200	0					
			1659449	73	155573	8	8
STAMPS.							
General	869256	58					
Postage	224281	8					
Composition Duty	56945	66					
			1150483	32	107857	16	3
TAXES.							
Assessment on Houses	—		36609	70	3432	3	2½
POSTAGE							
On letters, &c.	—		21159	12	1983	13	4¼
FINES AND FORFEITURES.							
Supreme, District, and Police Courts	63233	25					
Government Agents	161	73					
Other Departments	3156	41					
			66551	39	6239	3	10¼
Carried forward	. . .		8319317	56	779936	0	6

of the COLONY of CEYLON for the Year 1880.

EXPENDITURE.

	Salaries. Fixed. Rs	cts.	Salaries. Provisional. Rs	cts.	Allowances. Rs	cts.	Contingencies. Rs	cts.	Total. Rs	cts.
Civil Establishments.										
His Excellency the Governor	80311	75	15448	31	...		451	92	96214	98
Secretariat	12006	79	82317	20	...		36209	82	188593	81
Treasury	30375	0	3820	83	1786	45	735	64	36717	92
Audit Office	36449	99	17612	97	..		3282	31	57345	27
PROVINCIAL AGENCIES.										
Western Province	87811	46	50965	34	180	0	2756	5	141712	85½
North-Western Province	56451	24	18747	19	360	0	553	5½	76111	18
Southern do.	77829	97	27192	19	240	0	2451	61	107713	77
Eastern do.	49832	49	13389	5	...		705	38	63926	92
Northern do.	71970	21	33741	16	600	0	2325	61	108636	98
Central do.	92133	98	45462	24	...		2653	38	140549	60
North-Central do.	15829	99	26675	70	...		369	38	42875	7
Public Works Department	175001	7	156995	50	1639	92	3598	93	337235	12
Survey Department	64837	81	203549	37	1457	50	...		269814	68
CUSTOMS DEPARTMENT.										
Western and North-Western Provinces	60020	62	27841	73	499	92	7013	55	95375	82
Southern Province	17580	0	4245	96	...		1863	76	23689	72
Eastern do.	6890	0	925	10	...		410	35	7725	45
Northern do.	18495	42	4160	12	...		1381	94	24037	48
HARBOUR DEPARTMENT.										
Master Attendant, Colombo	6774	89	10056	93	321	29	164	60	17317	71
Do. Galle	5490	0	11110	0	...		625	50	17225	50
Do. Trincomalee	400	0	6092	0	...		408	18	6900	18
Do. Batticaloa	...		480	0	...		...		480	0
POST OFFICE	47064	30	74570	94	1300	0	15090	36	138025	60
DIRECTOR, ROYAL BOTANIC GARDENS	7575	75	10228	95	...		1912	63	19747	33
DIRECTOR, COLOMBO MUSEUM	...		15266	57	...		7204	64	22471	21
AGENT, COLONIAL STEAMER.	...		23670	63	1269	78	..		27940	41
JUDICIAL ESTABLISHMENTS.										
Supreme Court, Chief Justice	27699	96	..		...		..		27699	96
Senior and Junior Justices	40007	49	..		...		..		40007	49
Registry of the Supreme Court	21164	65	900	0	...		150	95	22215	60
Queen's and Deputies Queen's Advocates	47447	84	10845	11	.		390	74	58683	69
DISTRICT COURTS.										
WESTERN PROVINCE.										
Colombo	21100	0	4200	0	...		160	76	25460	76
Kalutara	13110	0	2850	0	...		196	7	16456	7
Kégalla	8490	0	2800	0	...		73	84	11363	84
Negombo	10139	64	2779	80	...		39	64	12959	8
Ratnapura	9830	0	2599	56	...		54	0	12483	56
NORTH-WESTERN PROVINCE.										
Chilaw	8331	83	1708	98	...		334	50	10375	31
Kurunégala	13050	73	3165	6	...		109	50	16325	29
SOUTHERN PROVINCE.										
Galle	19140	0	3620	0	..		608	88	22368	88
Mátara	10270	0	2170	0	..		213	7	12653	7
Tangalla	3040	0	200	0	..		113	87	3353	87
EASTERN PROVINCE.										
Batticaloa	11710	0	2750	0	..		173	19	14663	19
Trincomalee	3315	0	145	0	...		23	25	3483	25
NORTHERN PROVINCE.										
Jaffna	14460	0	2570	0	...		200	11	17230	11
Mannár	1850	0	500	0	...		77	36	2427	36
Mullaittívu	1770	0	220	0	.		107	95½	2097	95½
Vavuniya-Vilankulam	...		1003	0	...		29	0	1032	0
CENTRAL PROVINCE.										
Badulla	11346	41	1503	21	...		111	37	12960	99
Kandy	20319	97	4500	0			93	99	24913	96
NORTH-CENTRAL PROVINCE.										
Anuradhapura	2737	84	349	73	..		77	25	3164	82
Itinerating District Judge	...		5393	55	...		.		5393	55
Carried forward	1449684	9	891338	98	12654	86	95510	89	2449218	82

REVENUE—*continued.*

	Rs.	cts.	Rs.	cts.	£	s.	d.
Brought forward	—		8319317	56	779936	0	6
GOVERNMENT VESSELS	—		77840	72	7297	11	4
SALE OF GOVERNMENT PROPERTY.							
Salt	885820	58					
Arrack and Rum	3821	20					
Colonial Stores	43929	11½					
Timber	280900	23					
Weights and Measures	81	48					
Unserviceable Stores	8372	5					
Produce of Botanic Gardens	7908	81					
Crops growing on Crown Lands	1496	94					
Royalty on Coral Stone	32	50					
Sundries	7371	43					
			1239731	33½	116225	1	11
REIMBURSEMENTS.							
Hospital Stoppages	4585	53					
Government Gazette, &c.	8101	72					
School Fees, &c.	21524	30					
School Books, Stationery, &c.	7503	36					
Irrigation Works	14619	43					
Survey Fees	58474	23½					
Maintenance of Prisoners in Jails	2405	98					
Value of Tools lost	2966	43					
Value of Prison Labour	2489	75					
Refund of Civil Hospital expenses	10690	26					
Passage Money of Immigrant Coolies	12774	66					
Collections at Cemeteries	3467	84					
Storage of Gunpowder	8315	11					
Assessment Tax	925	55					
Cost of Police within Municipalities	123223	81					
Sundries	32448	40					
			333516	36½	31267	3	2
ELECTRIC TELEGRAPH	—		27291	67	2558	11	10
MISCELLANEOUS RECEIPTS.							
Payment on account of deficiency of Troops	95041	67					
Overpayments Recovered	312823	44½					
Contribution to Widows Pension Fund	1503	51					
Pioneer Pension Contributions	8783	64					
Unclaimed Deposits	1421	36½					
Sundries	35050	5½					
			454623	68½	42620	19	5
INTEREST.							
On Loan Board Funds	25333	2					
On Arrears of Revenue	27478	77½					
On Investments	124185	84					
			176997	63½	16593	10	7
PEARL FISHERY							
Proceeds of	—		200152	25	18761	5	5½
SPECIAL RECEIPTS.							
Fees for Title Deeds	8990	96					
Sundries	2	99					
			8993	95	843	3	8
RAILWAY RECEIPTS	—		3010658	95	282249	5	6
Carried forward	—		13849127	12	1298355	13	4½

EXPENDITURE—*continued.*

	Salaries. Fixed. Rs	cts.	Salaries. Provisional. Rs	cts.	Allowances. Rs	cts.	Contingencies. Rs	cts.	Total. Rs	cts.
Brought forward...	1449684	9	891838	98	12654	86	95540	89	2449218	82
COURTS OF REQUESTS AND POLICE COURTS.										
WESTERN PROVINCE.										
Avisawella and Pasyala . .	6240	0	2140	0	...		142	1	8522	1
Colombo Police Court . .	10450	0	2458	50½	...		373	6	13281	56½
Do. of Requests . .	10895	62	2120	23	...		38	50	13054	35
Kalutara . . .	...		7075	93	...		100	85	7176	78
Panadure . . .	6339	84	99	96	...		85	10	6524	90
Rakwana . . .	...		...		...		242	75	242	75
NORTH-WESTERN PROVINCE.										
Kalpitiya . . .	6340	0	266	70	...		22	50	6629	20
Kurunegala . . .	...		2232	20	...		77	20	2309	40
Puttalam . . .	2340	0	373	50	...		83	4	2796	54
SOUTHERN PROVINCE.										
Balapitimodera . . .	6502	99	224	97	...		52	0	6779	96
Galle	9840	0	2500	0	...		203	64	12543	64
Hambantota . . .	1820	0	200	0	...		3	0	2023	0
Matara . . .	5140	0	6604	18	...		109	95	11854	18
NORTHERN PROVINCE.										
Chavakachcheri . . .	1620	0	370	0	...		126	50	2116	50
Jaffna	6556	29	1298	68	...		211	52	8066	49
Kayts	5570	0	1320	0	...		112	0	7002	0
Mullakam . . .	...		870	0	...		164	97	1034	97
Point Pedro . . .	5407	36	1186	67	...		150	40	6744	43
EASTERN PROVINCE.										
Batticaloa . . .	...		940	0	...		...		940	0
CENTRAL PROVINCE.										
Dimbula and Dikoya . .	...		3079	92	...		111	88	3191	80
Galagedara . . .	6560	0	1380	0	...		30	0	7970	0
Gampola and Pusselawa . .	6349	27	1280	0	...		69	33	7698	60
Haldummulla . . .	4174	84	800	58	...		439	75	5415	17
Kandy	11075	0	1628	33	...		134	42	12837	75
Matale and Dambulla . .	6058	22	764	62	...		48	0	6870	84
Nawalapitiya . . .	...		5561	69	...		23	6	5584	75
Nuwara Eliya and Maturata .	1200	0	1410	0	...		50	0	2660	0
Panwila and Urugala . .	6840	0	982	15	...		52	63	7874	78
REGISTRATION DEPARTMENT.	68808	65	18754	3	32798	50	7981	58	128342	76
FISCALS.										
Western Province . .	27910	71	10373	26	966	63	1817	0	41067	60
North-Western Province . .	5944	39	5188	41	240	0	104	49	11477	29
Southern Province . .	11005	55	6878	9	...		653	25	18536	89
Eastern Province . .	4540	0	930	0	...		33	1	5503	1
Northern Province . .	10220	83	5040	91	...		497	69	15759	43
Central Province . .	18174	27	10765	41	...		319	72	29259	40
North-Central Province . .	900	0	700	0	...		88	73	1688	73
LOAN BOARD . . .	5300	0	200	0	360	0	71	95	5934	95
ECCLESIASTICAL ESTABLISHMENTS	84885	22	1805	19	9526	5	...		96216	46
Public Instruction . .	38314	20	185636	85	...		...		223951	5
Medical Department . .	67731	65	128965	65	13772	87	6192	48	236662	65
Police Department . .	23500	0	471748	48	3050	0	...		498298	48
Prisons Department . .	10677	27	3014	27	...		...		13691	54
Convict Establishments . .	12997	56	44721	80	...		.		57719	36
Colonial Store . . .	25204	22	2853	94	...		..		28058	16
Ceylon Government Railway .	...		488343	48	...		...		488343	48
Crown Agents . . .	...		4266	65	3466	33	..		7732	98
TOTAL...Rs	2013118	4	2330694	21½	76835	24	116561	85	4537209	34½
£	188729	16 4	218502	11 8	7203	6 1	10927	13 5¼	425363	7 6¼

REVENUE—*continued.*

	Rs.	cts.	£	s.	d.
Brought forward...	13849127	12	1298355	13	4½
Carried forward	13849127	12	1298355	13	4½

EXPENDITURE—*continued.*

Services, exclusive of Establishments.	Rs.	cts.	Rs.	cts.	£	s.	d.
Brought forward...	—		4537209	34½	425363	7	6¾
PENSIONS AND RETIRED ALLOWANCES.							
Paid in the Colony	180986	41					
Do. England	291465	65					
Do. India	21985	99					
			494438	5	46353	11	4
REVENUE SERVICES.							
Salt	174742	21					
Cinnamon	2109	30					
Grain	36401	82					
Arrack	32	0					
Pearl Fishery	87864	29					
Timber	123409	64					
Assessment	20317	28					
Botanic Gardens	11851	40					
Law Expenses	10510	84					
Commission on Stamps	166	80					
Do. on collection of Hospital Bills	161	60					
Land Sales	103109	90					
Licenses	2632	87					
Toll	898	95					
			573708	35	53785	3	2
ADMINISTRATION OF JUSTICE.							
Agents of Provinces	47672	56					
Registrar, Supreme Court	32906	93					
Queen's Advocate	3505	84					
District and Police Courts	21338	65					
Fiscals	95551	34					
			200974.	82	18841	7	9
ECCLESIASTICAL	—		3000	0	281	5	0
CHARITABLE ALLOWANCES.							
Agent, Western Province	16142	64					
North-Western Province	11391	75					
Southern do.	1966	44					
Eastern do.	4701	5					
Northern do.	6901	27					
Central do.	3712	50					
			44815	65	1201	9	1
EDUCATION	—		286504	89	26859	16	8
HOSPITALS.							
Agent, Western Province	112388	50					
North-Western Province	21471	44					
Southern do.	32285	68					
Eastern do.	9547	31					
Northern do.	18785	79					
Central do.	77358	54					
North-Central do.	611	9					
Principal Civil Medical Officer	40533	80					
Inspector-General of Police	10872	55					
			323854	70	30361	7	7
POLICE SERVICES.							
Inspector-General of Police	—		116319	99	10905	0	0
PRISON SERVICES.							
Agent, Western Province	42947	14					
North Western Province	19570	57					
Southern do.	45348	48					
Eastern do.	4224	51					
Northern do.	8852	1					
Central do.	80246	36					
North-Central do.	2203	0					
Superintendent of Convict Establishments	154420	40					
Inspector-General of Prisons	4797	65					
Government, Straits Settlements	159	36					
Government Agents in India	4158	17					
			366927	65	34399	9	4
RENT.							
Agents of Provinces	1495	0					
Surveyor-General	640	0					
Customs Department	150	0					
Registration Department	4232	40					
			6517	40	611	0	1¾
Carried forward ...	—		6954270	84½	651962	17	10½

REVENUE—*continued.*

	Rs.	cts.	£	s.	d.
Brought forward...	13849127	12	1298855	18	4½
Excess of Expenditure over Revenue ...	415362	92½	38940	5	5½
TOTAL . . Rs	14,264,490	4½	£1,337,295	18	10

CEYLON GOVERNMENT RAILWAY.

REVENUE, 1880.—Rs. 3,010,658·95.

	Rs.	cts.	£	s.	d.
Main Line ...	2289079	97	214601	5	0
Nawalapitiya Line ...	327508	61	30703	18	8
Kalutara Line ...	301618	39	28276	14	6
Breakwater Line ...	49535	50	4643	19	1
Wharf Line ...	7594	33	711	19	4½
Matale Line ...	35322	15	3311	8	10½
Rs. ...	3010658	95	282249	5	6

EXPENDITURE, 1880.—Rs. 2,279,664·01.

	Rs.	cts.	£	s.	d.
Main Line to Kandy, Working Expenses	887894	70	83240	2	7
Branch Line to Nawalapitiya ...	198322	22	18592	14	2
South Line to Kalutara ...	234884	38	22020	8	2¼
Breakwater Line	25114	21	2354	9	2
Wharf Line	8065	29	756	2	5
Matale Line	28942	25	2713	6	9
New Works, Main Line ...	26440	71	2478	16	4
Interest and Sinking Fund ...	870000	25	81562	10	5
Rs. ...	2279664	1	213718	10	0¼

EXPENDITURE—*continued.*

Services, exclusive of Establishments.—*continued*	Rs	cts.	Rs	cts	£	s.	d.
					Total.		
TRANSPORT. *Brought forward*	—		6954270	84½	651962	17	10½
His Excellency the Governor	7077	45					
Secretariat	1054	24					
Treasury	18505	54½					
Audit Office	1717	62					
Agent, Western Province	9129	20					
North-Western Province	5785	46½					
Southern do.	8324	50					
Eastern do.	4880	52					
Northern do.	6668	80					
Central do.	7130	61					
North-Central do.	6288	58					
Survey Department	13891	78					
Customs Department	399	8					
Director, Botanic Gardens	3662	81					
Do. Colombo Museum	2782	26					
Commissioner of Requests, Colombo	125	23					
Registration Department	2500	0					
Loan Board	1	0					
			99927	22	9368	3	6
CONVEYANCE OF MAILS	—		241184	69	22639	3	10
WORKS AND BUILDINGS.							
New Works and Buildings	272656	88					
Repairs and Additions	126391	80					
			399047	68	37410	14	5
ROADS, STREETS, BRIDGES, AND CANALS							
New Roads, &c.	394008	37					
Repairs, &c.	1953940	49					
Departmental Charges	188312	80					
			2536261	66	237774	10	7
MISCELLANEOUS.							
Treasurer	94060	58					
Agent, Western Province	2125	55					
" North-Western Province	1425	29					
" Southern do.	1450	50					
" Eastern do.	2199	85					
" Northern do.	6319	83					
" Central do.	16721	44					
" North-Central do.	5894	56					
Survey Department	339	98					
Harbour Department	9411	76					
Director, Botanic Gardens	2197	26					
Crown Agents	19184	60					
Government and Agents in India	1451	29					
			163112	49	15291	15	11
INTEREST	...		186550	90	17489	2	11¼
COLONIAL STORE	.		118977	53	11151	2	10½
CONTRIBUTION TOWARDS MILITARY EXPENDITURE	..		1239999	96	116249	19	11
GOVERNMENT VESSELS	...		79311	11	7438	1	7
REFUND OF DUTIES, DRAWBACKS, &c.	...		54186	71	5108	2	7
LANDS TAKEN FOR GOVERNMENT PURPOSES	..		5373	87	503	16	0¼
IMMIGRATION	..		110813	0	10388	14	1½
RAILWAY SERVICES.							
Interest and Sinking Fund	870000	25					
Maintenance and Working Expenses	921320	28					
			1791320	53	167936	6	0
TELEGRAPH SERVICES	...		88659	10	8311	16	4
EXCHANGE	...		191862	45	18268	7	1
TOTAL Rs.	-		14264490	4½	1337295	18	10

EXPENDITURE on Unexpended Balances of previous years. Votes brought forward in 1880

	Rs.	cts.
Works and Buildings	46444	68
Roads, Streets, and Bridges	22552	45
Rs...	68997	13

EXPENDITURE under Surplus Funds Ordinance No. 13 of 1879.

	Rs.	cts.
Railway Works	86930	34
Telegraph	7676	37
Roads	49959	50
Rs....	144566	21

Audit Office,
Colombo, 15th August, 1881.

W. D. WRIGHT,
Acting Controller of Revenue.

COMPARATIVE STATEMENT OF THE REVENUE OF THE COLONY FOR THE YEARS 1879 AND 1880.

	Revenue of 1879.		Revenue of 1880.		Increase.		Decrease.	
	Rs	cts.	Rs	cts.	Rs	cts.	Rs	cts.
1.—ARREARS OF REVENUE of former years	519009	10½	490482	8½	—		28527	2
2.—CUSTOMS.								
Imports, &c.	2925396	82	2928058	41	2661	59	—	
Plumbago	41042	44	51322	83	10280	39	—	
3.—PORT AND HARBOUR DUES.								
Port Clearances	95197	9	98872	84	3675	75	—	
Boats and Moorings	1121	25	1456	75	335	50	—	
Pilotage	24635	25	30775	0	6139	75	—	
4.—LAND SALES.								
Waste Lands	694010	5	508214	87	—		185795	18
Cinnamon Gardens	20	0	—		—		20	0
5.—LAND REVENUE.								
Paddy	798048	44½	774561	77	—		23486	67½
Fine Grain	72969	18	82221	4	9251	86	—	
Gardens	3681	54	13295	59	9614	5	—	
Tythes redeemed	7650	67	3737	12	—		3913	55
Rent of Lands	11917	4	9896	85½	—		2020	18½
Royalty on Cabook	311	17	414	15	102	98	—	
Licenses on Plumbago	800	0	2116	22	1316	22	—	
Cinnamon	2879	93	264	25	—		2615	68
Sundries	50	61	383	48	332	87	—	
6.—RENTS, EXCLUSIVE OF LANDS.								
Bridges, Canals, &c.	352551	56	346273	38	—		6278	18
Government Buildings and Houses	40670	73	42717	66	2046	93	—	
7.—LICENSES.								
Arrack, Rum, and Toddy	1667471	61	1638970	28	—		28501	33
Stills	8400	0	7830	0	—		570	0
Wholesale dealers	1080	0	1860	0	780	0	—	
Retail of Salt	40992	0	—		—		40992	0
Opium	2700	0	4400	0	1700	0	—	
Chunks	3417	76	4189	45	771	69	—	
Royalty on Elephants	200	0	2200	0	2000	0	—	
8.—STAMPS.								
General	935475	18	869256	58	—		66218	60
Postage	229662	9	224281	8	—		5381	1
Composition Duty	55681	73	56945	66	1263	93	—	
9.—TAXES.								
Assessment on Houses	38406	66	36609	70	—		1796	96
10.—POSTAGE.								
On Letters, &c.	17720	48	21159	12	3438	64	—	
11.—FINES AND FORFEITURES.								
Supreme, District, and Police Courts	40407	50	63233	25	22825	75	—	
Government Agents	295	39	161	73	—		133	66
Other Departments	3069	91	3156	41	86	50	—	
12.—GOVERNMENT VESSELS.	76590	60	77840	72	1250	12	—	
Carried over —	8713533	79	8397158	28	79874	52	396250	3

	Revenue of 1879		Revenue of 1880.		Increase.		Decrease.	
	Rs	cts.	Rs	cts.	Rs	cts.	Rs	cts.
Brought forward ...	8713533	79	8397158	28	79874	52	396250	3
13.—SALE OF GOVERNMENT PROPERTY.								
Salt - - -	797274	62	885520	58	88545	96	—	
Arrack and Rum - -	1158	40	3821	20	2662	80	—	
Colonial Store - -	678795	26	43929	11½	—		634866	14½
Timber - - -	232058	45½	280900	23	48841	77½	—	
Weights and Measures - -	212	28	81	48	—		130	80
Unserviceable Tools - -	4321	78½	8372	5	4050	26½	—	
Produce of Botanic Gardens -	4185	38	7908	81	3723	43	—	
Crops growing on Crown Lands -	797	32	1496	94	699	62	—	
Royalty on Coral Stones - -	65	50	32	50	—		33	0
Incidental - - -	8506	14½	7371	43	—		1134	71½
14.—REIMBURSEMENTS.								
Hospital Stoppages - -	6269	93½	4585	53	—		1684	40½
Government Gazette - -	7308	98	8101	72	792	74	—	
School Fees, Books, Stationery, &c. -	29795	31½	29027	66	—		767	65½
Irrigation Works - -	17252	15½	14619	43	—		2632	72½
Survey Fees - -	63094	47½	58474	23½	—		4620	24
Maintenance of Prisoners -	2848	66	2405	98	—		442	68
Value of Tools lost - -	5736	84	21966	43	16229	59	—	
Value of Prison Labour - -	12646	34½	2489	75	—		10156	59½
Refund of Civil Hospital expenses -	7686	32½	10690	26	3003	93½	—	
Passage Money of Immigrant Coolies -	20861	75	12774	66	—		8087	9
Collections at Cemeteries -	3115	50	3467	84	352	34	—	
Storage of Gunpowder - -	15825	15	8315	11	—		7510	4
Assessment Tax - -	1127	89	925	55	—		201	84
Cost of Police within Municipalities -	64280	77	123223	81	58943	4	—	
Incidental - - -	20783	70	32448	40	11664	70	—	
15.—MISCELLANEOUS RECEIPTS.								
Deficiency of Troops - -	74958	33	95041	67	20083	34	—	
Overpayments recovered - -	267640	64	312823	44½	45182	80½	—	
Contribution to Widows' Pension Fund	2137	8	1503	51	—		633	57
Pioneer Pension Contribution -	10111	53	8783	64	—		1327	89
Unclaimed Deposits - -	12916	86	1421	36½	—		11495	49½
Incidental - - -	27172	79	35050	5½	7877	26½	—	
16.—INTEREST.								
On Loan Board Funds - -	34431	45	25333	2	—		9098	43
On Arrears of Revenue - -	34038	31½	27478	77½	—		6559	54
On Investments - -	107430	15	124185	84	16755	69	—	
17.—PEARL FISHERY - -	84567	63	200152	25	115584	62	—	
18.—SPECIAL RECEIPTS.								
Fees for Title Deeds - -	8468	65	8990	96	522	31	—	
Incidental - - -	118	61	2	99	—		115	62
19.—RAILWAY RECEIPTS -	3365141	65	3010658	95	—		354482	70
20.—TELEGRAPH RECEIPTS -	—		27291	67	27291	67	—	
Rs	14748675	91	13849127	12	552682	41½	1452231	20½
£	1382688	7 5	1298355	13 4½	—			

Deduct Increase	Rs	552682	41½
Nett Decrease ..	Rs	899548	79
Equal to ...	£	84332 14	0½

REMARKS.

No. 1.—ARREARS OF REVENUE. More regular payments of the preceding year apparently caused this decrease, the old outstandings gradually disappearing.

" 2.—CUSTOMS. The increase is principally owing to a larger exportation of plumbago than in the preceding year.

" 3.—PORT AND HARBOUR DUES. The increase is attributable to the larger number and tonnage of vessels which entered inwards and outwards during the year.

" 4.—LAND SALES. Fewer waste lands have been brought forward for sale during 1880 than in the preceding year; hence the decrease.

" 5.—LAND REVENUE. The collections under this head are not so unsatisfactory as might have been expected during a year of depression. The decrease in revenue from paddy is owing to a less extent of land being brought under cultivation for want of sufficient rain in the North-Western Province, and to the decrease in the sale of paddy rents of 1880 in the Southern Province, which is, however, compensated for by a large increase in fine grain in the latter Province. The increase under this head would have been greater but for the bad crop in the Northern Province consequent on the long drought of 1880.

" 6.—RENTS, EXCLUSIVE OF LAND. The sale of toll-rents for 1880 realized less than those for 1879, and hence the decrease under that head. The increase under the head rent of Government buildings and houses is consequent upon certain new buildings occupied as private quarters by Government officials being entered in the rent roll and recoveries of rent being made thereon.

" 7.—LICENSES. The decrease in arrack licenses is owing to the rent being sold for a less sum than in the preceding year; and that in retail of salt entirely to the sales in the Northern Province being managed in aumani.

" 8.—STAMPS. The decrease is attributable to the slackness of mercantile and other transactions requiring the use of stamps.

" 9.—TAXES. The decrease is due to the transfer of house taxes in certain towns to the Local Boards.

" 10.—POSTAGE. This is a fluctuating item of revenue.

" 11.—FINES AND FORFEITURES. There has been an increase under this head in all the Provinces, notably in the Western Province, and may, perhaps, be attributed to the increase of petty offences.

" 12.—GOVERNMENT VESSELS. This small increase does not appear to call for any special remark.

" 13.—SALE OF GOVERNMENT PROPERTY. The increase in salt is due to the demand for exportation and home consumption being greater than in the preceding year; and in timber, to the extended operations of Forest Conservancy Department. The decrease in Colonial Store is the result of the new arrangements adopted in the receipt and issue of stores The other items of increase and decrease are casual, and hardly call for special remarks.

" 14.—REIMBURSEMENTS. The decrease in survey fees is due to fewer lands having been put up for sale during the year; in irrigation works to the failure of crop in the North-Western Province, rendering recoveries of sums due for the year impossible; in passage money of immigrant coolies to the falling off of the arrivals and departure of immigrants; and in prison labour to the cost of prison buildings expended from breakwater funds being set off against the earnings of prisoners employed on the breakwater. The increase in cost of Police within Municipalities is only apparent, the arrears due for the half-year ended 31st December, 1879, having been recovered during 1880. The other items are casual.

" 15.—MISCELLANEOUS RECEIPTS. These receipts are of a fluctuating nature.

" 16.—INTEREST. The decrease under the head "Loan Board Fund" is only apparent, as it will be made up in the early part of 1881. Under the head "Arrears of Revenue" the decrease is apparently in consequence of the payments of instalments having been made more regularly The increase "on investments" is owing to the funds in the hands of the Crown Agents having been invested in short loans till required for disbursements on the service of the Colony.

" 17.—PEARL FISHERY. The revenue under this head is the result of the fishery held in the early part of the year, realizing a larger sum than in the preceding year.

" 19.—RAILWAY RECEIPTS. The decrease is owing to the diminution of goods and passenger traffic caused by failure of the coffee crop and general depression in the island trade and industries.

" 20.—TELEGRAPH RECEIPTS. The receipt under this head is the result of the transfer of the Telegraph system of the Island from the Government of India to that of this Colony on the 1st July, 1880.

Audit Office,
Colombo, 15th August, 1881.

W. D. WRIGHT,
Acting Controller of Revenue.

COMPARATIVE STATEMENT OF THE EXPENDITURE OF THE COLONY OF CEYLON FOR THE YEARS 1879 AND 1880.

		Expenditure of 1879.		Expenditure of 1880.		Increase.		Decrease.	
	ESTABLISHMENTS; INCLUDING FIXED AND PROVISIONAL SALARIES, ALLOWANCES, AND OFFICE CONTINGENCIES.								
	CIVIL ESTABLISHMENTS.	Rs	cts.	Rs	cts.	Rs	cts.	Rs	cts.
1	His Excellency the Governor -	94947	39	96214	98	1267	59	—	
2	Secretariat - -	187200	8	188593	81	1393	73	—	
3	Treasury - -	36650	71	36717	92	67	21	—	
4	Audit Office - -	56424	62	57345	27	920	65	—	
	PROVINCIAL AGENCIES.								
5	Western Province - -	143362	83	141712	85	—		1649	98
6	North-Western Province - -	86801	62	76111	48½	-		10690	13½
7	Southern do. - -	100812	97	107713	77	6900	80	—	
8	Eastern do. - -	64442	99	63926	92	—		516	7
9	Northern do. - -	103250	25	108636	98	5386	73	—	
10	Central do. - -	144376	11	140549	60	—		3826	51
11	North-Central do. - -	59032	49	42875	7	3842	58	—	
12	Public Works Department -	380528	98	337235	42	—		43393	56
13	Survey Department - -	276126	23	269844	68	—		6281	55
14	Customs Department - -	149689	35	150828	47	1139	12	—	
15	Harbour Department - -	48462	96	41923	39	-		6539	57
16	Post Office - -	160460	73	138025	60	—		22435	13
17	Director, Royal Botanic Gardens -	19755	74	19747	33	—		8	41
18	Director of Colombo Museum -	23299	90	22471	21	—		828	69
19	Agent, Colonial Steamer "Serendib" -	26516	12	27940	41	1424	29	—	
	JUDICIAL ESTABLISHMENTS.								
20	Supreme Court Judges - -	66935	26	67707	45	772	19	—	
21	Registry of the Supreme Court -	22539	1	22215	60	—		323	41
22	Queen's Advocate and Deputies -	58841	2	58683	69	—		157	33
	DISTRICT COURTS, POLICE COURTS, AND COURTS OF REQUESTS.								
23	Western Province - -	125554	2	127525	66½	1971	64½	—	
24	North-Western Province - -	39104	2	38435	74	—		668	28
25	Southern do. -	73843	91	72576	55	—		1267	36
26	Eastern do. -	19149	62	19086	44	—		63	18
27	Northern do. -	47529	82	47751	81½	221	99½	—	
28	Central do. -	92260	83	98008	64	5747	81	—	
29	North Central do. -	3135	82	3164	82	29	0	—	
30	Itinerating District Judge -	7141	33	5393	55	—		2047	78
31	Registration Department -	119654	63	128342	76	8688	13	—	
	FISCALS.								
32	Western Province - -	39981	51	41067	60	1086	9	—	
33	North-Western Province - -	11983	37	11477	29	—		506	8
34	Southern do. - -	17928	75	18536	89	608	14		
35	Eastern do. - -	5531	33	5503	1	—		28	32
36	Northern do. - -	15065	52	15759	43	694	11	—	
37	Central do. - -	30183	45	29259	40	—		924	5
38	North-Central do. - -	1739	72	1688	73	—		50	99
39	Loan Board - - -	6335	69	5934	95	—		400	74
40	Ecclesiastical Establishments -	102758	5	96216	46	—		6541	59
41	Public Instruction - -	227342	20½	223951	5	—		3391	15½
42	Medical Department - -	269969	5	236662	65	—		33306	40
43	Police Department - -	497894	2	498298	48	404	46	—	
44	Prisons Department - -	14142	5	13692	54	—		450	51
45	Convict Establishments - -	60964	52	57719	36	—		3245	16
46	Colonial Store - -	27437	11	28058	16	621	5	—	
47	Ceylon Government Railway -	583898	95	488343	48	—		95555	47
48	Crown Agents - -	3199	34	7732	98	4533	64	-	
	Rs	4734585	79½	4537209	34½	47720	96	245097	41
	£	443867 8	4¼	425363 7	6¾	4473 16	9¾	22977 17	7¼

		Expenditure of 1879.		Expenditure of 1880.		Increase.		Decrease.	
	SERVICES, EXCLUSIVE OF ESTABLISHMENTS.	Rs	cts.	Rs	cts.	Rs	cts.	Rs	cts.
49	Pensions and Retired Allowances -	469018	18	494438	5	25419	87	—	
50	Revenue Services - -	479431	30½	573708	35	94277	4½	—	
51	Administration of Justice - -	90039	50	200974	82	110935	32	—	
52	Ecclesiastical - -	3000	0	3000	0	—		—	
53	Charitable Allowances - -	75102	59	44815	65	—		30286	94
54	Education - -	216412	3	286504	89	70092	86	—	
55	Hospitals and Sanitation - -	293817	42	323854	70	30037	28	—	
56	Police Services } - -	341101	82	483247	64	142145	82	—	
57	Prison Services }								
58	Rent - -	42991	48	6517	40	—		36474	8
59	Transport - -	250207	33	99927	22	—		150280	11
60	Conveyance of Mails - -	162002	89	241484	69	79481	80	—	
61	Works and Buildings - -	397072	31½	399047	68	1975	36½	—	
62	Roads, Streets, Bridges, and Canals -	3182198	9½	2536261	66	—		645936	43½
63	Miscellaneous Services - -	207518	44	163112	49	—		44405	95
64	Interest - - -	168887	21	186550	90	17663	69	—	
65	Colonial Store - -	152239	70	118977	53	—		33262	17
66	Contribution towards Military Expenditure - - -	1242999	96	1239999	96	—		3000	0
67	Government Vessels - -	61180	73	79341	11	18160	38	—	
68	Refund of Duties, Drawbacks, &c. -	58663	61	54486	71	—		4176	90
69	Lands taken for Government purposes -	5672	14	5373	87	—		298	27
70	Immigration - - -	108801	24	110813	0	2011	76	—	
71	Railway Services - -	1575194	80	1791320	53	216125	73	—	
72	Railway Construction - -	150000	0	—		—		150000	0
73	Electric Telegraph - -	—		88659	40	88659	40	—	
74	Exchange - -	219698	90	194862	45	—		24836	45
	Rs	9953251	68½	9727280	70	896986	32	1122957	30½
	£	933117 6	11½	911932 11	4	84092 9	4	105277 4	11½
	RECAPITULATION.								
	Establishments - -	4734585	79½	4537209	34½	—		197376	45
	Services, exclusive of Establishments -	9953251	68½	9727280	70	—		225970	98½
	Rs	14687837	48	14264490	4½	—		423347	43½
	TOTAL—£	1376984 15	3¾	1337295 18	10	—		39688 16	5¾

Audit Office,
Colombo, 15th August, 1880.

W. D. WRIGHT,
Acting Auditor-General and Controller of Revenue.

EXPLANATORY STATEMENT OF THE FOREGOING.

CIVIL ESTABLISHMENTS.	Rs	cts.	Rs	cts.	Rs	cts.
1.—HIS EXCELLENCY THE GOVERNOR.						
Increase on Fixed Salaries - -	1125	0				
Do. Provisional Salaries - - -	213	57				
			1338	57		
Decrease on Contingencies - - -		-	70	98		
Nett Increase -					1267	59
2.—SECRETARIAT.						
Increase on Provisional Salaries - - -	1670	38				
Do. Contingencies - -	1173	61				
			2843	99		
Decrease on Fixed Salaries - - -		-	1450	26		
Nett Increase -					1393	73
3.—TREASURY.						
Increase on Fixed Salaries - - -	25	0				
Do. Provisional - - -	390	83				
Do. Allowances - - -	237	81				
			653	64		
Do. Contingencies - -		-	586	43		
Nett Increase -					67	21

	Rs	cts.	Rs	cts.	Rs	cts.
4.—Audit Office.						
Decrease on Fixed Salaries - -	-	-	0	1		
Increase on Provisional Salaries - -	700	8				
Do. Contingencies - -	220	58				
			920	66		
Nett Increase -					920	65
Provincial Agencies :—						
5.—*Western Province.*						
Decrease on Fixed Salaries - -	-	-	303	90½		
Do. Provisional Salaries - -	-	-	1144	39½		
Do. Contingencies - -	-	-	201	68		
Total Decrease -					1649	98
6.—*North-Western Province.*						
Decrease on Provisional Salaries - -	10735	81				
Do. Allowances - -	165	0				
			10900	81		
Increase on Fixed Salaries - -	62	47				
Do. Contingencies - -	148	20½				
			210	67½		
Nett Decrease -					10690	13½
7.—*Southern Province.*						
Increase on Provisional Salaries - -	6966	7				
Do. Allowances - - -	60	0				
Do. Contingencies- - -	341	76				
			7367	83		
Decrease on Fixed Salaries - -	-	-	467	3		
Nett Increase -					6900	80
8.—*Eastern Province.*						
Decrease on Provisional Salaries - -	-	-	763	76		
Increase on Fixed Salaries - -	52	0				
Do. Contingencies - -	195	69				
			247	69		
Nett Decrease -					516	7
9.—*Northern Province.*						
Increase on Provisional Salaries - -	5079	85				
Do. Allowances - -	600	0				
			5679	85		
Decrease on Fixed Salaries - -	140	22				
Do. Contingencies - -	152	90				
			293	12		
Nett Increase -					5386	73
10.—*Central Province.*						
Decrease on Fixed Salaries - -	1972	81				
Do. Provisional Salaries - -	2174	21				
			4147	2		
Increase on Contingencies - -	-	-	320	51		
Nett Decrease -					3826	51
11.—*North-Central Province.*						
Increase on Provisional Salaries - -	-	-	4329	54		
Decrease on Fixed Salaries - -	368	14				
Do. Contingencies - -	118	82				
			486	96		
Nett Increase -					3842	58
12.—Public Works Department.						
Decrease on Fixed Salaries - -	-	-	9820	37		
Do. Provisional Salaries - -	-	-	12471	30		
Do. Allowances - -	-	-	0	7		
Do. Contingencies - -	-	-	21101	82		
Total Decrease -					43393	56
13.—Survey Department.						
Decrease on Fixed Salaries - -	1945	56				
Do. Allowances - -	998	74				
Do. Contingencies - -	16069	86				
			19014	16		
Increase on Provisional Salaries - -	-	-	12732	61		
Nett Decrease -					6281	55
14.—Customs Department.						
Increase on Provisional Salaries - -	2365	88				
Do. Contingencies - -	2092	6				
			4457	94		
Decrease on Fixed Salaries - -	3318	74				
Do. Allowances - -	0	8				
			3318	82		
Nett Increase -					1139	12

	Rs	cts.	Rs	cts.	Rs	cts.
15.—Harbour Department.						
Decrease on Fixed Salaries - -	- 300	11				
Do. Allowances - -	- 678	71				
Do Contingencies - -	- 8015	57				
			8994	39		
Increase on Provisional Salaries -	-	-	2454	82		
Nett Decrease -					6539	57
16.—Post Office.						
Decrease on Fixed Salaries - -	- 1567	3½				
Do. Allowances - -	- 200	0				
Do. Contingencies - -	- 24809	14				
			26576	17½		
Increase on Provisional Salaries - -	-	-	4141	4½		
Nett Decrease -					22435	13
17.—Director Botanic Gardens.						
Decrease on Fixed Salaries - -	- 3	75				
Do. Allowances - - -	- 3000	0				
			3003	75		
Increase on Provisional Salaries - -	- 2258	1				
Do. Contingencies - -	- 737	33				
			2995	34		
Nett Decrease -					8	41
18.—Director of Colombo Museum.						
Decrease on Provisional Salaries -	-	-	1033	33		
Increase on Contingencies - -	-	-	204	64		
Nett Decrease -					828	69
19.—Agent, Colonial Steamer "Serendib."						
Increase on Provisional Salaries - -	-	-	1336	53		
Do. Allowances - -	-	-	87	76		
Gross Increase -					1424	29
JUDICIAL ESTABLISHMENTS.						
20.—Supreme Court Judges.						
Increase on Fixed Salaries - -	-	-	—		772	19
21.—Registrar, Supreme Court.						
Decrease on Provisional Salaries - -	- 50	0				
Do. Contingencies - -	- 290	6				
			340	6		
Increase on Fixed Salaries - -	-	-	16	65		
Nett Decrease -					323	41
22.—Queen's Advocate and Deputies.						
Decrease on Provisional Salaries - -	- 642	46				
Do Contingencies - -	- 18	34				
			660	80		
Increase on Fixed Salaries - -	-	-	503	47		
Nett Decrease -					157	33
District Courts, Courts of Requests, and Police Courts.						
23.—*Western Province.*						
Increase on Fixed Salaries - -	- 41	43				
Do. Provisional Salaries - -	- 2174	58½				
			2216	1½		
Decrease on Contingencies - -	-	-	244	37		
Nett Increase -					1971	64½
24.—*North-Western Province.*						
Decrease on Provisional Salaries - -	-	-	1350	43		
Increase on Fixed Salaries - -	- 369	19				
Do Contingencies - -	- 312	96				
			682	15		
Nett Decrease -					668	28
25.—*Southern Province.*						
Decrease on Fixed Salaries - -	-	-	5598	11		
Increase on Provisional Salaries - -	- 3739	73				
Do. Contingencies - -	- 591	2				
			4330	75		
Nett Decrease -					1267	36
26.—*Eastern Province.*						
Decrease on Contingencies - -	-	-	63	24		
Increase on Fixed Salaries - -	-	-	0	6		
Nett Decrease -					63	18
27.—*Northern Province.*						
Increase on Provisional Salaries - -	- 459	54				
Do. Contingencies - -	- 28	66½				
			488	20½		
Decrease on Fixed Salaries - -	-	-	266	21		
Nett Increase -					221	99½

	Rs	cts.	Rs	cts.	Rs	cts.
28.—*Central Province.*						
Increase on Fixed Salaries - - -	4246	83				
Do. Provisional Salaries - - -	1530	46				
			5777	29		
Decrease on Contingencies - - -		-	29	48		
Nett Increase -					5747	81
29.—*North-Central Province.*						
Increase on Fixed Salaries - - -		-	7	12		
Do. Provisional Salaries - - -		-	1	28		
Do. Contingencies - - -		-	20	60		
Gross Increase -					29	0
30.—Itinerating District Judge.						
Decrease on Provisional Salaries - - -		-	—		2047	78
31.—Registration Department.						
Increase on Fixed Salaries - - -		-	221	95		
Do. Provisional Salaries - - -		-	7555	24		
Do. Allowances - - -		-	477	50		
Do. Contingencies - - -		-	433	44		
Gross Increase -					8688	13
Fiscals.						
32.—*Western Province.*						
Increase on Provisional Salaries - - -	45	99				
Do. Allowances - - -	966	63				
Do. Contingencies - - -	189	21				
			1201	83		
Decrease on Fixed Salaries - - -		-	115	74		
Nett Increase -					1086	9
33.—*North-Western Province.*						
Decrease on Fixed Salaries - - -		-	155	61		
Do. Provisional Salaries - - -		-	151	59		
Do. Contingencies - - -		-	198	88		
Gross Decrease -					506	8
34.—*Southern Province.*						
Increase on Provisional Salaries - - -		-	1608	9		
Decrease on Fixed Salaries - - -	14	45				
Do. Contingencies - - -	985	50	999	95		
Nett Increase -					608	14
35.—*Eastern Province.*						
Decrease on Contingencies - - -		-	—		28	32
36.—*Northern Province.*						
Increase on Fixed Salaries - - -		-	20	83		
Do. Provisional Salaries - - -		-	553	46		
Do. Contingencies - - -		-	119	82		
Gross Increase -					694	11
37.—*Central Province.*						
Decrease on Fixed Salaries - - -		-	485	13		
Do. Provisional Salaries - - -		-	174	59		
Do. Contingencies - - -		-	264	33		
Gross Decrease -					924	5
38.—*North-Central Province.*						
Decrease on Contingencies - - -		-	66	74		
Increase on Fixed Salaries - - -	10	38				
Do. Provisional Salaries - - -	5	37	15	75		
Nett Decrease -					50	99
39.—Loan Board.						
Decrease on Allowances - - -	546	67				
Do. Contingencies - - -	87	40				
			634	7		
Increase on Fixed Salaries - - -	33	33				
Do. Provisional Salaries - - -	200	0				
			233	33		
Nett Decrease -					400	74
40.—Ecclesiastical Department.						
Decrease on Fixed Salaries - - -		-	2742	43		
Do. Provisional Salaries - - -		-	951	47		
Do. Allowance - - -		-	2847	69		
Gross Decrease -					6541	59
41.—Public Instruction.						
Decrease on Fixed Salaries - - -		-	2677	76		
Do. Provisional Salaries - - -		-	713	39½		
Gross Decrease -					3391	15½
42.—Medical Department.						
Decrease on Contingencies - - -		-	36147	66		
Increase on Fixed Salaries - - -	82	57				
Do. Provisional Salaries - - -	2279	84				
Do. Allowances - - -	478	85				
			2841	26		
Nett Decrease -					33306	40

	Rs	cts.	Rs	cts.	Rs	cts.
43.—Police Department.						
Increase on Provisional Salaries - -	-	-	17205	35		
Decrease on Fixed Salaries - -	624	99				
Do. Allowances - -	11014	77				
Do. Contingencies - -	5161	13				
			16800	89		
Nett Increase.	-				404	46
44.—Prisons Department.						
Decrease on Provisional Salaries -	199	89				
Do. Contingencies - -	290	39				
			490	28		
Increase on Fixed Salaries - -	-	-	39	77		
Nett Decrease	-				450	51
45.—Convict Establishment.						
Decrease on Provisional Salaries - -	-	-	3338	72		
Increase on Fixed Salaries - -	-	-	93	56		
Nett Decrease	-				3245	16
46.—Colonial Store.						
Increase on Fixed Salaries - -	-	-	137	11		
Do. Provisional Salaries - -	-	-	483	94		
Gross Increase	-				621	5
47.—Ceylon Government Railway.						
Decrease on Provisional Salaries - -	-	-	955	54		
Do. Allowances - -	-	-	22180	94		
Do. Contingencies - -	-	-	72418	99		
Gross Decrease	-				95555	47
48—Crown Agents.						
Increase on Provisional Salaries - -	-	-	1067	31		
Do. Allowances - -	-	-	3466	33		
Gross Increase	-				4533	64

49.—Pensions and Retired Allowances.—The increase under this head is caused partly by the addition of new pensioners, and partly by the pensions payable in India not having been claimed regularly, so that the amount paid is constantly fluctuating.

50.—Revenue Services.—The increase is consequent upon the alteration adopted in the classification of expenditure in the estimate for the year, by which certain charges, hitherto included under Establishments, are transferred to this service, and partly to increased expenditure on account of timber and pearl fishery as resulting in increased receipts.

51.—Administration of Justice.—This increase is also mainly due to the transfer of certain charges hitherto brought to account against "Miscellaneous" and "Transport," such as salaries of Presidents of Village Tribunals, and travelling expenses of Fiscals, Judicial Officers, and their Establishments.

52.—Ecclesiastical.—The expenditure is the same as in the preceding year.

53.—Charitable Allowances.—A large expenditure was incurred in 1879 for the relief of destitute persons in the Eastern and Central Provinces. Such an expenditure was not necessary in 1880, hence the decrease.

54.—Education.—This increase is apparent and real: apparent, because of the transfer of the expenditure which was hitherto brought to account under the heads "Transport," and "Rent;" and real, because of the extension of the Grant-in-aid scheme.

55.—Hospitals and Sanitation.—This increase is also apparent, being the result of the transfer of certain expenditure hitherto brought to account by the Principal Civil Medical Officer under the heads "Contingencies," "Rent," and "Transport;" and by the Inspector-General of Police under the head "Police and Prisons."

56 & 57.—Police and Prison Services.—This apparent increase is due to the transfer of certain charges hitherto brought to account under the heads "Transport," "Allowances," "Rent," and "Contingencies." It has partially been counterbalanced by the transfer from this service to Hospitals and Sanitation of the expenditure for relieving and removing the sick and destitute and burying dead paupers.

58.—Rent.—The reduction of expenditure under this head is only apparent caused by the transfer of certain charges hitherto paid under this head to other heads of service.

59.—Transport. The reduction is due to the same cause as the foregoing.

60.—Conveyance of Mails.—This increase is partially due to the transfer of charges hitherto brought to account against Transport and Rent, and to the extension of the Postal System.

61.—Works and Buildings.—The small increase under this head does not call for any special remark.

62.—Roads, Streets, and Bridges.—The reduction of expenditure under this head is consequent upon the disbursements upon new roads, bridges, &c., being less extensive than in the preceding year.

63.—Miscellaneous Services.—The reduction of this expenditure is chiefly owing to the transfer of charges hitherto brought to account under this head to other Services.

64.—Interest.—This increase is due to the further loan of £50,000 received from the Public Works Loan Commission for Harbour Works in May, 1879, and for which interest became due in February, 1880.

65.—Colonial Store.—This decrease is only apparent.

67.—Government Vessels.—The increase is owing to the Colonial Steamer "Serendib" having been sent to Bombay for repairs, and another vessel being chartered in her place.

68.—Refund of Duties.—This is a fluctuating item of expenditure.

69.—Lands taken for Government Purposes.—The same as the foregoing.

70.—Immigration.—The transfer of certain charges hitherto brought to account under the heads "Provisional Salaries," "Transport," and "Miscellaneous" caused this apparent increase.

71.—RAILWAY SERVICES.—The increase is owing to the payment of interest on the loans raised for the construction of the Mátalé and Nánu-oya lines of railway. There has however been a large decrease in the working expenses, notwithstanding the expenditure incidental to the opening of the Mátalé railway in October last and the transfer of expenditure hitherto brought to account under the heads "Allowances" and "Contingencies" to "Railway Services."

72.—RAILWAY CONSTRUCTION.—The decrease is simply because no appropriation has been made in the Supply Bill of 1880 for this Service.

73.—ELECTRIC TELEGRAPH.—The expenditure in this year is in consequence of the transfer of the Telegraph to this Government.

74.—EXCHANGE.—The decrease under this head is due to the more favourable rates ruling during the year.

Audit Office,
Colombo, 15th August, 1881.

W. D. WRIGHT,
Acting Controller of Revenue.

IV.—STATEMENT showing the ASSETS and LIABILITIES of the Government of Ceylon on the 31st December, 1880.

ASSETS.	Rs	cts.	Rs	cts.	£	s.	d.
Cash in the General Treasury and District Chests - -	1711133	18					
Cash in the hands of the Crown Agents - -	87521	57					
Invested in England in Colonial Stocks £43,600 @ 1s. 8d. -	523200	0					
Temporary investments in England on short Loan - -	2232911	38					
Loans made to Municipal Council, Kandy - -	241846	45					
Interest outstanding on Municipal Council, Kandy - -	23426	4					
Advances made to Public Officers on proceeding to Ceylon to be recovered - - - -	1066	68					
Recoverable advances made on account of Harbour Works -	925667	29					
Do. do. Railway Extension Surveys - -	44480	93					
Do. do. Matale Railway - -	127000	0					
Do. do. Colombo Water-works - -	1199075	13½					
Do do. Mauritius Government - -	104	72					
Do. do. Seed Paddy - - -	89106	27					
Do. do. Straits Government - -	450	75					
Do. do. Stationery obtained from England -	123753	33					
Do. do. Steamer "Serendib" - -	30004	60					
Do. do. Melbourne Exhibition - -	5000	0					
Do. do. Police Services - -	26630	25					
Do. do. Basses Light Ships - -	10000	0					
Do. do. Stores required for Public Service -	809796	9					
Other recoverable advances - - -	323630	40½					
Sundry payments made by the Crown Agents to be recovered -	24763	4					
Loan to Kandy Industrial School - - -	9980	0					
Due by Hotels Company on account of land transferred -	7475	50					
Recoverable arrears of Revenue - - -	600000	0					
Surcharges outstanding - - -	300000	0					
			9478023	61	888564	14	3
LIABILITIES.							
Deposits—General - - Rs. 6,718,110 32¾							
Do Lapsed Loan Board - ,, 148,334 41							
	6866444	73¾					
Balance due to Government of India - - -	113976	41					
Do. Agents, Bombay - - -	304	53					
Do Agents, Madras - - -	549	15					
Do. Agents, Calcutta - - -	63	94					
Due to Post Office, London, on account of postage - -	5348	18					
Unexpended balances of ordinary votes brought forward for expenditure in 1881 - - -	76099	78					
Unexpended balances of votes under Surplus Fund Ordinance No. 13 of 1879 - - - -	630433	79					
Family Remittances outstanding - - -	28503	52					
Interest on Guaranteed Fund due to Railway Contractor -	19	7					
Due Her Majesty's Government on account of balance of unclaimed wrecks - - - -	428	28					
Balance of Drafts and remittances outstanding - -	370280	84½					
			8092452	23¼	758667	7	11¼
Excess of Assets over Liabilities on 31st December, 1880 -	—		1385571	37¾	129897	6	3¾
Total Assets - - -	—		9478023	61	888564	14	3

Audit Office,
Colombo, 23rd August, 1881.

W. D. WRIGHT,
Acting Controller of Revenue.

V.—STATEMENT OF CASH TRANSACTIONS OF THE COLONY FOR THE YEAR 1880.

	Rs	cts.	£	s.	d.
To Balance on 31st December, 1879	1,550,716	31½	145,379	13	1
Gross Revenue for the year	13,849,127	12	1,298,355	13	4¼
Drafts drawn during the year	11,389,120	43½	1,067,730	0	9½
Deposits during the year	19.155,600	85	1,795,837	11	7¼
Remittances received	4,172,144	38	391,138	10	8¾
Advances repaid	9,713,912	63	910,679	6	2¼
Local investments withdrawn	285,153	91	26,733	3	7
Sums placed to the credit of Her Majesty's Government	1,236	70	115	18	9¼
Do. Government of India	73.953	30	6,933	2	5¼
Do. Straits Government	279	36	26	3	9½
Do. Agents at Calcutta	1,264	94	118	11	9
Do. Agents at Madras	6,469	58	606	10	5½
Do. Agents at Bombay	2,614	39	245	2	0
Do. Crown Agents	3,602 239	79	337,709	19	7½
Receipts of the Crown Agents	19,728,939	29	1,849,588	1	2¼
Repayment of loan to Municipal Council, Kandy	4,217	62	395	8	0½
Total ...	83,536,990	61	7,831,592	17	4¾

	Rs	cts.	£	s.	d.
By Gross Expenditure of the year, viz.:—					
On the Votes of the year	14,264,490	4½	1,337,295	18	10
Against Balances of previous years' votes brought forward in 1880	68,997	13	6,468	9	7½
On votes allowed by Surplus Fund Ordinance No. 13 of 1879	144,566	21	13,553	1	7¾
	14,478,053	38½	1,357,317	10	1¼
By Drafts paid during the year	11,516,042	77	1,079,629	0	2½
Payments from deposits	15,255,296	8½	1,430,184	0	2
Remittances made	4,102,315	31	384,592	1	2½
Advances made	8,194.764	21	768,259	2	10½
Sums debited to Her Majesty's Government	808	42	75	15	9½
Do. Government of India	2,280	16	213	15	2½
Do. Straits Government	279	36	26	3	9½
Do. Agents at Calcutta	1,201	0	112	11	10½
Do. Agents at Madras	9,757	64	914	15	7
Do. Agents at Bombay	2,661	12	249	9	7¼
Do. Crown Agents	8,338,136	31	781,700	5	7
Disbursements made by the Crown Agents	19,802,174	70	1,856,453	17	6¾
Cost of New Cent Coins	18,085	0	1,695	9	4½
Temporary advance from Oriental Bank Corporation repaid	16,480	39	1,545	0	9
	81,738,335	86	7,662,968	19	8¾
By Balance on 31st December, 1880, viz.:—					
In the Colony (Rs 1,711,133 18)					
In England (Rs 87,521 57)	1,798,654	75	168,623	17	8
Total ...	83,536,990	61	7,831,592	17	4¾

Audit Office,
Colombo, 15th August, 1881.

W. D. WRIGHT,
Acting Controller of Revenue.

VI.—STATEMENT showing the BALANCE of the Ceylon Government AVAILABLE FOR APPROPRIATION on 31st December, 1880.

	Rs.	cts.	£	s.	d.
Cash in the General Treasury and District Chests	1,711,133	18			
Cash in the hands of the Crown Agents	87,521	57			
Invested in England in Colonial Stocks £43,600 @ 1/8	523,200	0			
Temporary investments in England on short loans	2,232,911	38			
Loan made to Municipal Council, Kandy	241 846	45			
Advances made to Public Officers on proceeding to Ceylon to be recovered	1,066	68			
Recoverable advances made on account of Harbour Works	925,667	29			
Do. do. Railway Extension Surveys	44,480	93			
Do. do. Matale Railway	127,000	0			
Do. do. Colombo Water-Works	1,199,075	13½			
Do. do. Mauritius Government	104	72			
Do. do. Seed Paddy	89,106	27			
Do. do. Straits Government	450	75			
Do. do. Stationery obtained from England	123,753	33			
Do. do. Steamer "Serendib"	30,004	60			
Do. do. Melbourne Exhibition	5,000	0			
Do. do. Police Service	26,630	25			
Do. do. Basses Light Ships	10,000	0			
Sundry payments made by the Crown Agents to be recovered	24,763	4			
Loan to Kandy Industrial School	9,980	0			
Advances outstanding on 31st December, 1880, recovered during the 1st quarter of 1881	235,140	15			
Value of stores issued to Public Departments outstanding on 31st December, 1880, recovered during the 1st quarter of the current year	93,245	6			
	7,742,080	78½	725,820	1	5

	Rs.	cts.	Rs.	cts.	£	s.	d
Deposits, General	6,718,110	32¾					
Do. Lapsed Loan Board	148,334	41					
			6,866,444	73¾			
Balance due to Government of India			113,976	41			
Do. Agents, Bombay			304	53			
Do. do. Madras			549	15			
Do. do. Calcutta			63	94			
Due to Post Office, London, on account of Postage			5,348	18			
Unexpended balances on ordinary votes brought forward for expenditure for 1881			76,099	78			
Unexpended balances of votes under Surplus Fund Ordinance No. 13 of 1879			630,433	79			
Family remittances outstanding			28,503	52			
Interest on Guarantee Fund due Railway Contractor			19	7			
Due to Her Majesty's Government on account of balance of unclaimed wrecks			428	28			
			7,722,171	38¾	723,953	11	4
Balance			19,909	39¼	1,866	10	1
			7,742,080	78½	725,820	1	5

AVAILABLE FOR APPROPRIATION ON 31ST DECEMBER, 1880. — *NIL.*

Audit Office,
Colombo, 23rd August, 1881.

W. D. WRIGHT,
Acting Controller of Revenue.

VII.—*STATEMENT showing the REVENUE and EXPENDITURE of the Colony of Ceylon for the Nine months ended 30th September*, 1881.

REVENUE.	Rs.	Cts.
Arrears of revenue of former years recovered	381,162	93½
Revenue of the Current Year.		
Customs	2,228,665	16
Port and Harbour Dues	111,049	32
Land Sales...	248,459	55½
Land Revenue	640,902	63
Rents, exclusive of Land	277,661	39
Licenses	1,113,939	66
Stamps	670,171	76
Taxes—Assessment on Houses and Gardens	10,320	55½
Postage	181,223	68
Fines and Forfeitures	36,506	45½
Government Vessels	18,562	77
Sale of Government Property	739,881	19
Reimbursements in aid of expenses incurred by Government	352,610	2½
Interest	76,898	17
Miscellaneous	210,979	81
Special Receipts	8,791	66
Pearl Fishery	—	
Telegraph	350	0
Railway Receipts	2,019,633	40
Receipts by the Crown Agents in London	—	
Rs....	9,327,770	12½

EXPENDITURE.	Rs.	Cts.
Establishments.		
Fixed Salaries	1,446,580	69
Provisional and Temporary Salaries	1,670,824	69
Allowances	51,680	11
Office Contingencies	62,502	64½
Services, exclusive of Establishments.		
Pensions and Retired Allowances	300 276	82
Revenue Services	354,121	71
Administration of Justice	132,168	58½
Ecclesiastical	1,000	0
Charitable Allowances	32,198	59
Education	206,609	44
Hospitals	187,174	11
Police and Jails	289,705	8
Rent	2,380	37
Transport...	71,628	88
Conveyance of Mails	173,862	96
Works and Buildings	77,792	21
Roads, Streets, and Bridges	1,016,890	12
Miscellaneous	153,531	7
Interest	132,508	20
Colonial Store	24,737	89
Contribution towards Military Expenditure	992,999	97
Government Vessels	68,462	25
Refund of Duties	27,794	51
Lands taken for Government purposes	571	22
Immigration	62,451	22
Railway Services	1,067,013	12
Telegraph Services	83,424	64
Advances for the Public Service, to be subsequently classified and brought to account under the proper Heads of Expenditure, exclusive of Advances on account of Breakwater, Stores, Waterworks, and Railway, &c.	531,988	37
Rs....	9,159,879	47

Audit Office,
Colombo, 30th November, 1881.

W. H. RAVENSCROFT,
Auditor-General and Controller of Revenue.

VIII.—*COMPARATIVE STATEMENT of the REVENUE and EXPENDITURE of the Colony of Ceylon for the Nine Months ended 30th September, 1880-81.*

REVENUE.	Nine months ended 30th September, 1880.	Nine months ended 30th September, 1881.	Increase.	Decrease.
	Rs. cts.	Rs. cts.	Rs. cts.	Rs. cts.
Arrears of Revenue of former years recovered	450,101 26½	381,162 93½	—	68,938 33
Revenue of the Current Year.				
Customs ...	2,197,961 7	2,228,665 16	30,704 9	—
Port and Harbour Dues...	98,030 50	111,049 32	13,018 82	—
Land Sales ...	409,355 1	248,459 55½	—	160,895 45½
Land Revenue ...	677,302 26	640,902 63	—	36,399 63
Rents, exclusive of Land	282,819 72	277,661 39	—	5,158 33
Licenses	1,217,652 53	1,113,939 66	—	103,712 87
Stamps	901,669 29	670,171 76	—	231,497 53
Taxes, Assessment on Houses and Gardens ...	21,402 58	10,320 55½	—	11,082 2½
Postage	12,330 97	181,223 68	168,892 71	—
Fines and Forfeitures ...	40,723 65	36,506 45½	—	4,217 19½
Government Vessels ..	52,830 63	18,562 77	—	34,267 86
Sale of Government Property	839,045 72	739,881 19	—	99,164 53
Reimbursements in aid of expenses incurred by Government ...	362,998 75	352,610 2½	—	10,388 72½
Interest	85,172 53	76,898 17	—	8,274 36
Miscellaneous ...	233,961 34	210,979 81	—	22,981 53
Special Receipts ..	5,859 98	8,791 66	2,931 68	—
Pearl Fishery ...	200,152 25	—	—	200,152 25
Telegraph ...	—	350 0	350 0	—
Railway Receipts ...	2,192,344 99	2,019,633 40	—	172,711 59
Total—Rs.	10,281,715 3½	9,327,770 12½	215,897 30	1,169,842 21
			Deduct Increase .	215,897 30
			Nett Decrease...Rs.	953,944 91

EXPENDITURE.	Nine months ended 30th September, 1880.	Nine months ended 30th September, 1881.	Increase.	Decrease.
Establishments.	Rs. cts.	Rs. cts.	Rs. cts.	Rs. cts.
Fixed Salaries .	1,483,712 76	1,446,580 69	—	37,132 7
Provisional & Temporary Salaries	1,682,174 9½	1,670,824 69	—	11,349 40½
Allowances	46,901 73	51,680 11	4,778 38	—
Office Contingencies ...	74,416 0½	62,502 64½	—	11,913 36
Services, exclusive of Establishments				
Pensions and Retired Allowances	289,942 8	300,276 82	10,334 74	—
Revenue Services ...	332,228 90	354,121 71	21,892 81	—
Administration of Justice ...	112,435 68	132,168 58½	19,732 90	—
Ecclesiastical ...	2,000 0	1,000 0	—	1,000 0
Charitable Allowances ...	31,356 68	32,198 59	841 91	—
Education	235,278 5	206,609 44	—	28,668 61
Hospitals	194,617 46	187,174 11	—	7,443 35
Police and Jails ...	298,200 0	289,705 8	—	8,494 92
Rent	3,352 50	2,380 37	—	972 13
Transport ...	72,594 1½	71,628 88	—	965 13½
Conveyance of Mails ...	166,327 55	173,862 96	7,535 41	—
Works and Buildings .	317,494 84	77,792 21	—	239,702 63
Roads, Streets, and Bridges ...	1,589,751 63	1,016,890 12	—	572,861 51
Miscellaneous ...	62,441 53	153,531 7	91,089 54	—
Interest ..	99,601 90	132,508 20	32,906 30	—
Colonial Store ..	71,578 73	24,737 89	—	46,840 84
Contribution towards Military Expenditure ...	929,999 97	929,999 97	—	—
Government Vessels ...	33,053 86	68,462 25	35,408 39	—
Refund of Duties ...	33,193 31	27,794 51	—	5,398 80
Lands taken for Government Purposes... ..	14 25	571 22	556 97	—
Immigration ..	73,776 43	62,451 22	—	11,325 21
Railway Services ...	938,154 28	1,067,013 12	128,858 84	—
Telegraph Services ...	32,097 4	83,424 64	51,327 60	—
Advances for the Public Service, to be subsequently classified and brought to account under the proper heads of expenditure excluding Advances on account of Breakwater Stores, Waterworks, and Railway, &c. ...	797,649 59	531,988 37	—	265,661 22
Total—Rs.	10,004,344 86½	9,159,879 47	405,263 79	1,24 ,729 19
			Deduct Increase ...	405,263 79½
			Nett Decrease ... Rs.	844,465 39½

Audit Office,
Colombo, 30th November, 1881.

W. H. RAVENSCROFT,
Comptroller-General of Revenue.

IX.—*COMPARATIVE Statement of the Estimated and Actual REVENUE and EXPENDITURE of the Colony of Ceylon for the Nine Months ended 30th Sept., 1881.*

REVENUE.	Estimated.		Actual.		Increase.		Decrease.	
	Rs	cts.	Rs.	cts	Rs.	cts.	Rs	cts
Arrears of revenue of former years recovered	300,000	0	381.162	93½	81,162	93½	—	
Revenue of the Current Year.								
Customs ...	2,250,000	0	2,228,665	16	—		21,334	84
Port and Harbour Dues ...	105,000	0	111,049	32	6,049	32½	—	
Land Sales	262,500	0	248,459	55½	—		14,040	44½
Land Revenue ...	750,000	0	640,902	63	—		109,097	37
Rents, exclusive of Land	270,000	0	277,661	39	7,661	39	—	
Licenses	1,162,500	0	1,113,939	66	—		48,560	34
Stamps	765,000	0	670,171	76	—		94,828	24
Taxes, Assessment on Houses and Gardens ...	22,500	0	10,320	55½	—		12,179	44½
Postage	183,750	0	181.223	68	—		2,526	32
Fines and Forfeitures ...	33.750	0	36,506	45½	2.756	45½	—	
Government Vessels .	52,500	0	18,562	77	—		33.937	23
Sale of Government Property	780,000	0	739,881	19	—		40,118	81
Reimbursements in aid of Expenses incurred by Government ...	232,500	0	352,610	2½	120,110	2½	—	
Interest	75,000	0	76,898	17	1,898	17	—	
Miscellaneous ..	225,000	0	210,979	81	—		14,020	19
Special Receipts ...	7,500	0	8,791	66	1.291	66	—	
Pearl Fishery ..	225,000	0	—		—		225.000	0
Railway Receipts ...	2,403,000	0	2,019,633	40	—		383,366	60
Telegraph	48,000	0	350	0	—		47.650	0
	10,153,500	0	9,327,770	12½	220,929	95½	1,046,659	83
					Deduct Increase ...		220,929	95½
					Nett Decrease ...		825,729	87½

EXPENDITURE.	Estimated.		Actual.		Increase.		Decrease.	
Establishments.	Rs	cts.	Rs.	cts	Rs.	cts	Rs.	cts
Fixed Salaries	1,527.965	25	1,446,580	69	—		81,384	56
Provisional and Temporary Salaries	1,840,661	57½	1,670,824	69	—		169,836	88½
Allowances ...	65,913	75	51 680	11	—		14,233	64
Office Contingencies ...	77,819	2½	62.502	64½	—		15,316	38
Services exclusive of Establishments.								
Pensions and Retired Allowances ...	339,331	4	300,276	82	—		39,054	22
Revenue Services	414,243	0	354,121	71	—		60,121	29
Administration of Justice ...	120,157	50	132,168	58½	12,011	8½	—	
Ecclesiastical	2,250	0	1,000	0	—		1,250	0
Charitable Allowances ...	34,275	0	32,198	59	—		2,076	41
Education	198,701	25	206,609	44	7,908	19	—	
Hospitals	279,913	87½	187,174	11	—		92,739	76½
Police and Jails	324,435	0	289,705	8	—		34,729	92
Rent	2,707	50	2,380	37	—		327	13
Transport	79,218	75	71,628	88	—		7,589	87
Conveyance of Mails ...	209,225	7	173,862	96	—		35,362	11
Works and Buildings ..	106,627	50	77,792	21	—		28,835	29
Roads, Streets, and Bridges ...	1,279.008	75	1,016,890	12	—		262,118	63
Miscellaneous	184,297	12½	153.531	7	—		30,766	5½
Interest	136,631	25	132,508	20	—		4,123	5
Colonial Store	93,427	44	24,737	89	—		68,689	55
Contribution towards Military Expenditure	930,000	0	929,999	97	—		0	3
Government Vessels ...	45.000	0	68,462	25	23,462	25	—	
Refund of Duties	37,500	0	27,794	51	—		9,705	49
Lands taken for Government Purposes	1,500	0	571	22	—		928	78
Immigration	88,897	50	62,451	22	—		26,446	28
Railway Services	1,540,762	50	1,067,013	12	—		473,749	38
Telegraph Services ...	71,250	0	83,424	64	12,174	64	—	
Exchange	37,500	0	—		—		37,500	0
	10,069,219	65	8,627,891	10	55,556	16½	1,496,884	71½
					Deduct Increase ...		55,556	16½
					Nett Decrease ...		1,441,328	55

Audit Office,
Colombo, 30th November, 1881.

W. H. RAVENSCROFT,
Auditor-General.

X.—*ESTIMATE of the REVENUE and EXPENDITURE of the Colony of Ceylon for the Year* 1882.

REVENUE.	Rs.	cts.
Arrears of Revenue of former years ...	400,000	0
Customs	3,000,000	0
Port and Harbour Dues ..	145,000	0
Land Sales	350,000	0
Land Revenue	875,000	0
Rents, exclusive of Land ...	360,000	0
Licenses	1,5"0,000	0
Stamps ...	900,000	0
Taxes	30,000	0
Postage	240,000	0
Fines, Forfeitures, and Fees of Court ...	45,000	0
Government Vessels ...	70,000	0
Sale of Government Property ...	1,150,000	0
Reimbursements in aid of Expenses incurred by Government ...	300,000	0
Electric Telegraph	60,000	0
Miscellaneous Receipts ...	270,000	0
Interest	200,000	0
Special Receipts	10,000	0
Railway Receipts	3,050,000	0
Total Rs.—	13,025,000	0

EXPENDITURE.	Rs.	cts.	Rs.	cts.	Rs.	cts.
Fixed Establishments.						
Civil	1,132,777	75				
Do.	4,920	0				
Judicial	601,860	0				
Ecclesiastical	87,200	0				
Public Instruction	37,750	0				
Medical	85,050	0				
Police	23,500	0				
Prisons	10,650	0				
Convict Establishment	12,840	0				
Colonial Store	26,271	25				
			2,022,819	0		
Interest on Breakwater loan	--		207,000	0		
Contribution towards Military Expenditure ...	—		1,240,000	0		
Railway Interest and Sinking Fund	—		775,530	0		
					4,245,349	0
Charges voted by the Legislative Council in Appropriation Ordinance for 1882	—		—		8,711,604	18
					12,956,953	18
Surplus Revenue	—		—		68,046	82
			Total—Rs.		13,025,000	0

Council Chamber,
Colombo, 14th December, 1881.

J. DOUGLAS,
Colonial Secretary.

XLI.—1881.

IRRIGATION IN THE NORTHERN PROVINCE.

REPORT

UPON THE

PROPOSED RESTORATION OF THE GIANT'S TANK.

BY HENRY PARKER, ESQ.,
IRRIGATION OFFICER.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1882.

PROPOSED RESTORATION OF THE GIANT'S TANK.

THE following report contains particulars of an unfinished irrigation work that, while ranking—among Ceylon reservoirs—next to the stupendous Padawiya tank in size, is in some respects the most interesting and instructive example of the later and probably the most advanced practice of Siṇhalese engineering. But though holding an inferior position as regards mere dimensions, the scheme appears to be capable of, and to offer a fair prospect of, a more extended development than any other purely artificial work of the same character.

2. The report has been divided into three parts: the first being a description of the original works and their object; the second detailing some general principles and data affecting their restoration; the third dealing with their restoration, which involves some important modifications of the original design. The third part is sub-divided into three sections: (1) proposed works; (2) estimated cost; (3) prospects of revenue. Some notes bearing on the subject of the report are placed in an appendix.

PART I.—DESCRIPTION.

3. *Outlines.*—The Giant's tank (in Tamil, *Sodayan Kaṭṭu Karei*, 'the giant-built embankment') is situated on the north bank of the Aruvi-áṛu, in the Mannár District of the Northern Province, close to the Mannár-Maḍavachchiya road, along the side of which it and its connected works extend for a distance of fifteen miles—from the 11th to the 26th miles from Mannár.

4. These works form the most important part of the ancient project for the irrigation of the Mannár plain, referred to in my general report, and they were intended to divert the water of the Aruvi-áṛu, and to impound it in a suitable reservoir overlooking and capable of irrigating that portion of the plain which lies between the above river and the Nay-áṛu, a minor stream entering the sea at Viḍattaltívu, fifteen miles further north.

5. Briefly stated, they consist of a weir (in Tamil *Tékkam*, 'an obstruction,' 'that which turns the water') built across the Aruvi-áṛu; a storage reservoir (the Giant's tank) on the high side of the plain; and a supply canal (*alavakka*, 'channel,' 'water-course') from the weir to the reservoir. Their systematic description naturally divides itself into—(1) the Aruví-áṛu, (2) the Tékkam, (3) the Alavakka, (4) the Giant's tank, and (5) the lands they were intended to irrigate; to which are added some remarks concerning the ancient design.

(1.)—*The Aruvi-áru.*

6. The Aruvi-áṛu ('waterfall river'), or Malwatta-oya, is a seasonal intermittent river which, rising among the outlying spurs of the Mátalé hills, flows first in a north-westerly direction through the North-Central Province, and afterwards almost due west across the southern portion of the Northern Province, entering the sea at Arippu. In the lower fifteen miles of its course it passes through the Mannár plain, a river about 150 feet wide and from 20 to 25 feet deep (except near the sea, where it is shallower and very much wider), with a sandy bed, and apparently but slight fall. For many miles above this its bed is more or less rocky, low, irregular ridges of gneiss, mostly semi-stratified at the surface, alternating with nearly level reaches of sand and gravel; its inclination is moderate, in eight miles measured the fall being about one foot in 1,100; its mean width varies from 120 to 200 feet, and its depth from 25 to 35 feet. The rock in its bed does not extend up the banks; the river has merely cut through an upper stratum of loam or gravelly soil, and in places through a lower one of decomposed gneiss. Regarding the characteristics of the Malwatta-oya in the North-Central Province I possess little information, but up to Anurádhapura they appear to be unchanged. Higher up the basin it crosses the Central road and the road from Dambulla to Trincomalee, its bed being sandy at each place. How far it extends above the latter crossing is as yet unknown, but the distance is certainly considerable, for Mr. Winchester, of the Public Works Department, has informed me that the river is occasionally in flood at the road when but slight rain has fallen in the neighbourhood of the ford. Making a suitable allowance for this distance, the total length of the river may be about 100 miles.

7. Its drainage area is undetermined. It must, however, be very extensive, the river flowing in the North-Central Province, and for some length between it and the Northern Province, through a wide valley, in which it receives the discharge of several good-sized streams. Those on the east side rise many miles away in the low, rocky ridge

GIANT'S TANK.

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bounding the watershed—the dividing ridge of the northern part of the Island—and during the monsoon rains they all bring down considerable bodies of water. The heavy floods sometimes experienced in the lower part of the river are doubtless in great measure due to the contributions of these tributaries rather than to the flow of the main river. Almost no connection can be traced between the rainfall of Anurádhapura and Mihintale—both in the bed of the valley—and the ordinary flow of the river; and the flood discharge at the Trincomalee-Dambulla road-crossing, where the Malwatta-oya is only some 60 or 70 feet wide, appears to be comparatively small. In fact, the effect of floods flowing from such a distant part of the basin would be found in a prolongation of the period of flood-discharge through the Mannár plain, rather than in any material augmentation of the volume. With the very imperfect information at my disposal, I estimate the drainage area at fully 2,000 square miles, and more probably 2,500 miles.

8. With respect to the flow of the Aruvi-áru near the site of the works, reliance has been placed only upon information gathered at Puliyadi-irakkam, on the north bank, three miles below the Tékkam, where the people see the river every day, and upon my own observations and measurements. Except in the case of a few special floods, little has been learnt regarding the discharge previous to 1877; but 1880 and 1881 having been particularly dry years, when the *ordinary minimum* amount of water passed down the river, the flow in those years has been accepted as affording a moderately safe guide in calculating the quantity obtainable for irrigation

9. Commonly, the flow begins in the latter part of October, and continues until the end of February. In 1880 it began on October 29th. During this period several 'freshes' or small floods come down, the increased discharge lasting for about nine days at a time, after which the flow resumes its normal state. In very favourable years there is a continuous flood-discharge for two months, it is said, but such cases are exceptional. Judging by the information obtained and my own experience, it does not appear that more than three freshes can be confidently expected in the north-east monsoon—one at the end of October, one in November, and one at the end of the year—though in average seasons four or more may occur. In two years out of the last twenty only one small fresh has been seen. The usual volume of the ordinary minimum freshes is about 7,000 cubic feet per second, and the annexed diagram of one which occurred in January, 1881, probably represents their average discharge; it has been plotted from measurements taken on three of the days, the rest of the outline being drawn in accordance with observations of similar cases. In the interval between the freshes the volume of water brought down is somewhat variable, but always small, except in favourable years; in an average year it may fall as low as 200 cubic feet per second, while in dry years it is sometimes less than 100 feet per second. In calculating the amount of water obtainable for irrigation it has been assumed that three freshes, as shown in the diagram, will occur, and that the intermediate discharge will average 200 feet per second.

10. High floods may be looked for once or twice in each decade, especially about the maximum sun-spot period, but no particulars can be obtained of any previous to 1862. In that year there was the greatest flood within the memory of persons now living in the district, its volume being, as nearly as can be ascertained, 32,000 feet per second. Calculated by Kutter's formula at eight suitable cross sections, its crest appears to have reached the foot of a small secondary upper bank a short distance back from the true bank; there is, therefore, reason to believe that it closely indicates the maximum discharge of the river. If a greater flood had taken place only once in 100 years, its action through the many centuries during which the river has flowed could hardly have failed to leave some higher mark on this small upper bank. Although, owing to the escape of the greater part of the flood-water down the upper part of the Alavakka, no flood in the last 700 years can possibly have reached its former level immediately below the Tékkam, the small secondary bank there is as clearly defined as in the lower parts of the river. The fact that had the river been in its original state so recent a flood as that of 1862 would, if the data on which the calculation is based are correct, have risen up to this ancient undoubted floodmark, is noteworthy as by no means favouring the hypothesis of a gradual dessication of the drainage area. Evidence regarding the average rainfall in former times is and must necessarily be wanting, but it certainly appears that there has been no important diminution in the volume of maximum floods.

11. During the south-west monsoon the flow of the river is very uncertain and irregular. It ordinarily begins at the end of April, and continues until the end of May; but little dependence can be placed on it, and in this last south-west monsoon (1881), and also four or five times during the previous twenty years (according to the evidence collected), it has entirely failed. In 1880 one fresh came down in the first week of May, and a small discharge lasted until June; but after the middle of the month it was too slight to have been of any practical use. In very favourable years three or more of these freshes have been seen in the south-west monsoon, but in this season high floods seem to be unknown. One fresh can usually be expected, with a discharge of some 5,000 cubic feet per second when at its highest.

12. It is said that in 1874 there was a flood in the river in July; this is the only flow of the kind that is remembered, and evidently it was quite an abnormal event. In some years there are also freshes in March and September, but their volume is insignificant.

13. The following are the floods and freshes of which the approximate discharge has been ascertained :—

1862	...	N.E. Monsoon	...	32,000 cubic feet per second.
1872	...	do.	...	7,600 (?)
1873	...	do.	...	300
1874	...	do.	...	300
1877	...	do.	...	25,000
1878	...	do.	...	10,900
1879	...	do.	...	12,500
1880	...	May	..	5,500
,,	...	November 8th	...	6,800
,,	.	December 29th	...	7,500
1881	...	January 18th	...	6,800

(2.)—*The Tékkam.*

14. The Tékkam is a weir of most substantial character carried in a downstream curve across the Aruvi-áṛu at a point 21½ miles from its mouth (following its sinuosities), and immediately opposite the 26th mile-post on the Mannár-Madavachchiya road. It has a total discharging length of 640 feet; its general height is 12 feet; its full breadth 90 feet. It rests throughout upon hard granitic gneiss, cracked at the surface, yet capable of withstanding the eroding effect of water pouring over the dam. It is constructed at an excellent site—probably the best one to be found—there being a good approach for floods down a straight reach 160 feet wide on the high side, and ample facility for their escape below. The line of the downstream face of the anicut has a peculiar bend at the north end; this, as well as the curve in the rest of the work, appears to have been given to it in order to follow the highest ridge of the rock, and thus effect a small saving in the amount of masonry needed.

15. The work consists of large wedged and unwedged stones in regular courses from one to two feet deep, laid in mortar in both faces and in excellent concrete in the heart of the dam. The stones employed have, as a rule, an approximately rectangular shape, many being admirably wedged. They are of good size, suitable for the work, and including the hearting their average weight is about 8 cwt.; those in the faces probably weigh double this. The latter are more or less chisel-worked, expecially on the beds; and in the lower face each course is stepped back six inches from the line of the under one, into which it is sunk one and a half inch. Though rough, the whole dam is well built, the joints, where not otherwise close, being completely filled with hand-laid stones and lime concrete, which is now nearly as hard as the gneiss itself.

16. The protective works are confined to the northern end. Thirty-five feet of the dam were carried up one course (= 3 feet) above the rest of the weir, and at the north end of this a retaining or shield wall five feet in height was built to protect a high mound of earth run out from the closely adjoining river bank. On the mound there are the remains of a brick building of some kind. In this part of the work rough unwedged boulders are laid in irregular courses without mortar; they are of massive dimensions, and have successfully resisted all floods. The weights of some measured are 4½ tons, 3 tons, 4 tons, 4½ tons. These are upper ones; to judge by the faces of the rest many are much heavier than this, and the weight of the largest one may be estimated at certainly 10 tons, possibly 15 tons.

17. The effective length of the weir is so very much greater than the mean width of the river at the spot (in the proportion of nearly 4 to 1) as to lead to the conclusion that a flood (of which there is also proof at the Modaragama-oya works) must have occurred during the construction of the Tékkam, washing out much soil round the south end. The damage was made good, not by again filling up the breach with earth, but by extending the anicut across it. In this manner it was evidently hoped to secure an immunity from injury in the future, but the effect of blows by the trunks of large trees brought down by heavy floods was under-estimated. With the exception of a few stones at one end, all the up stream face, which was carefully built of squared stones, has been rolled away down to the level of the silt that probably soon collected on that side, the damage has spread across all that part of the weir exposed to the action of the most rapid current, the top course being completely, and the second course partly, removed from the portion lying in the line of the river. That the shock caused by the impact of heavy logs is the chief danger to be apprehended is plainly shown by the present condition of the work, for although a great part of the flood waters does not now pass over the weir, the stone work is littered with the trunks of many large trees, one being some ten feet in circumference. If not artificially held down, the largest stone commonly made use of would be displaced on being struck by such a log during the period of maximum floods. Where a weir has a vertical upstream face, as in this instance, and the flood-volume is sufficient to carry down the trunks of the enormous kumbuk trees which line the banks of all the rivers in the northern part of the Island, many, if not most of them weighing more than 5 tons, neither close joints nor mere weight, unless it be so great as to render the stones unwieldy, will make the work secure. This is still more clearly seen at the Ridi Bánda-ella, the anicut on the Deduru-oya for diverting water to Nikaweratiya.

(3.)—*The Alavakka.*

18. The canal for conveying the river water to the Giant's tank left the Aruvi-áṛu on the north side at about 200 feet above the Tékkam. Carried northwards for 500 feet,

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it was then turned westwards, and ran in a winding course almost parallel to the general line of the river for four miles, with a fall of 1 in 5,000. Thence it gradually diverged from the river until at 6½ miles it emerged on the plain. As stated in my general report, this plain has a fall of three or four feet per mile about 1 in 1,500. To reduce the gradient, therefore, the channel was continued in a much more serpentine course for the rest of its length, so that a fall of one foot in 2,500 was obtained for it. There is no reason to doubt that these sinuosities, though irregular, have been intentionally given, and it could be for no other purpose; they follow no special custom, and they increased the amount of excavation needed. But the fall was still double that in the upper part of the channel, which was in deeper cutting, and to lower the velocity of the water that was to flow down the width through the higher part of the plain was greatly increased, and the depth (apparently) lessened. While for the first few miles after leaving the river the breadth of the base, when well defined, is from 40 to 50 feet, in this lower portion it is quite 70 feet. The channel does not end on arriving at the Giant's tank, but is continued through it in even a more circuitous manner until about two miles from the low side of the tank. In this part it is again narrower, averaging 50 feet; most of the water would, however, escape over the banks and flow down through the adjoining jungle, so that, in reality, any channel was hardly needed. Its total length is 17 miles, though the direct distance from the Tékkam to the Giant's tank is only 9 miles. Where the channel is not necessarily in deep cutting and is in good order, the depth is 4 or 5 feet; in the forest the depth varies from 8 to 20 feet, and in the Giant's tank it is about 3 feet.

19. Most of the earth excavated in the bed of the canal was deposited on its lower side in the form of a bank of varying size. This is so small for the greater part of the first few miles, where the heaviest cutting was unavoidable, that one cannot but conclude all the excavation was not finished. In this part of the canal two or three feet of soil must still be removed, if the proposal for the completion of the works be adopted, and in all probability this was the case up to the head-sluice, according to the original one. The statement in my general report that the cutting of one of the channels was completed was therefore erroneous.

20. A head-sluice was built at about 150 feet from the junction of the channel with the river, and traces of it are still visible. It appears to have been formed of brickwork on a flooring of moderate-sized wedged stones, and similarly constructed wing-walls, for the protection of the banks of the canal, extended for some distance at the site. The bricks used are of the dimensions ordinarily adopted in former times by the Siṇhalese, and are much larger than those found in the Tamil constructions at Mantoṭa. I spent several hours in examining them in the hope of discovering some letters scratched on them—as is often the case—and thus meeting with a clue to the date of their manufacture, but the search proved unsuccessful.

21. Probably this head-sluice was only in course of erection on the occurrence of the flood that damaged the south end of the Tékkam. At any rate, the flood water found its way over or through the sluice and into the canal, down which it poured until a small cross stream leading to the Aruvi-áṛu was encountered. So long as the canal followed the course of this stream, which it did for about 1,000 feet, no very serious result can have ensued; but at the point where the stream diverged to the Aruvi-áṛu the southern embankment that blocked it up and formed one side of the canal or Alavakka, though of sufficient height—to judge by the level of the remains—was unable to withstand the pressure (being new work and certainly without puddle);—and the torrent, bursting through it, poured down the bed of the stream and rejoined the river. Destruction of all the upper part of the canal must have rapidly followed, until it presented much the same appearance as now—a river fully half the width of the Aruvi-áṛu, its bed cut down to the solid rock. Practically, it has become the river, for, except in high freshes and floods, all the water runs down the Siṭṭáṛu (small river) as it is now termed.

22. Of course much water had already passed down part of the canal, and with the same effect as above; at every stream-crossing in the first few miles a breach must have been made. There can be little chance of error in supposing that these breaches were formed at the time of this first great flood;* had the banks thrown across the streams been able to resist it when the earth was newly-deposited and incompact, and when the local rainfall was largely increased by water flowing from the river, they would assuredly have been able to withstand the effects of subsequent heavy rains unaugmented by the river-water. Additional proof that the damage was caused at this time may be found in the absence of any artificial flood-escapes along the line of the canal. The bank could not fail to give way in some places. Had the works ever been completed these escapes would have been constructed; they were not omitted in other channels.

Some other breaches, not at stream crossings, were perhaps caused at the same time. The bank was merely carried away at these spots, and no watercourse having been cut, later floods have not escaped by them.

* That a great flood occurred is certain; evidences of it are to be found in various parts of the works, both here and at the Modaragama-oya. The only question is whether all the main portion of the damage is to be ascribed to it or in part to other later floods. As evidence of subsequent great floods is wanting, the only one that can be proved to have happened must be credited with the mischief—which it would be fully capable of effecting.

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23. The repair of the Alavakka seems to have been begun before the progress of the works finally ceased. When the canal was first opened the excavated soil was, as above stated, thrown out along its low (or river) side in the form of an embankment, which is still in existence. But in the upper (or Sittáru) part of the work this was not the most suitable line for the bank; the ground a little nearer the river was higher for most of the distance. This discovery appears to have been made when the repairs were commenced, and levels (presumably) taken over the line showed that part of it required raising in order to be quite safe from future high floods. These low places were therefore blocked up by a short strong embankment having a top from 30 to 110 feet wide. The spectacle is thus presented (or would be presented were it not for the dense jungle with which everything is covered) of an embankment—(not merely heaps of 'spoil')—along the side of the channel, and, for a short distance, another higher and much stronger one behind it, nearer the river; and I fail to see that any other hypothesis will satisfactorily account for the peculiarity. The work of repair then proceeded no further, however.

24. Long afterwards, some paltry and ridiculously ineffective repairs seem to have been attempted, but the result was utter failure. Probably they were the outcome of the engineering knowledge, or want of knowledge, of the Tamil occupants of the district, and they were unlike any ordinary Sinhalese work. Endeavours were made to construct a masonry dam across the Sittáru at the point where it leaves the original line of the Alavakka, and returns to the river, but the work made little progress, and only five stones are now visible at the site. A few others have been utilized in the erection of a culvert on the Mannár-Madavachchiya road. Low banks of earth were also run across three of the other breaches, and faced with small dry rubble. Of course they were carried away at the first heavy rains (for which no other escape was provided, the banks being too low to divert the water down the Alavakka, towards the Giant's tank), but traces of them are still to be seen.

25. The breadth of the best-defined part of the Alavakka being 70 feet, its fall there being one foot in 2,500, and the probable depth of water to be turned down it being three feet, the discharge, with the channel in good order, would have been 500 cubic feet per second, flowing with a mean velocity of 2·28 feet per second. From a consideration of the flow of the Aruvi-áru, as previously stated, it may be estimated that the total amount of water secured during the north-east monsoon, in good average years, would have been 2,300 millions of cubic feet, or about 85 millions of cubic yards. (*Vide* Appendix *Note* 1.)

(4.)—*The Giant's Tank.*

26. The Giant's tank is about two miles north of the Aruvi-áru, and it extends along the side of the Mannár-Madavachchiya road for about five and a quarter miles. Like the other storage reservoirs of the district, it is situated at the upper edge of the Mannár plain, and is enclosed on three sides by its embankment.

27. An idea of its shape is given by stating that it slightly resembles that of Ceylon itself, the embankment being supposed to run round from north of "Mullaittívu" to a little beyond "Galle." From this point to "Colombo" there is a natural low ridge or spur projecting from the higher ground immediately above the tank; along this very little earth-work was needed. From "Colombo" to "Jaffna" the tank abuts against the higher forest tract, into which the upper contours extend for a short distance. If two breaches be imagined between "Dondra Head" and "Galle," and the supply canal be further supposed to enter at "Mullaittívu," winding along the side as far as "Batticaloa," and the bed of the tank to slope down at three feet per mile from "Jaffna" to within a mile of the breaches, beyond which point it is nearly level, a faint notion of the salient features in the outline of the Giant's tank will be obtained.

28. Its length is 5½ miles, and its breadth at the widest part 3 miles. For the determination of its area and capacity with various heads of water, the slight inclination of its bed made it requisite to fix a contour at every foot in height, the result being as follows:—

Depth of water, in feet.	Area of water surface, in acres.	Capacity, in millions of cubic feet.	
At sluice level ..	820	28·65	Unavailable.
1 ..	1,260	45 30	Available.
2 ...	1,675	109·19	
3 ...	1,930	187·69	
4 ...	2,395	281·87	
5 ...	2,810	395·21	
6 ...	3,300	528·29	
7 ...	3,750	681·83	
8 ...	4,290	856 99	
9 ...	4,425	1046·74	
10 ...	4,985	1251 69	
11 ...	5,220	1473·93	
12 ...	5,410	1705·45	
13 ...	5,640	1946 12	
14 ...	5,840	2189 15	
15 ...	6,120	2449·64	
16 ...	6,380	2721 89	

Total capacity, 2,750,540,000 cubic feet.

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The mean depth is probably greater in proportion to the maximum depth (being ·61 of it) than is the case at any other reservoir formed on the natural surface of the ground.

29. Shallow as it is, it ranks not unworthily among the great reservoirs of the world, as appears from the following list of some of the more important ones. (It is much to be regretted that almost nothing is yet known of many large tanks in Ceylon that are omitted from the table):—

Country.	Reservoir.	Area in acres.	Capacity in millions of cubit feet.	Remarks.
Madras	Víránam	22,000	Unknown	Ancient.
Ceylon	Padawiya	10,000*	7,000*	Estimated.
Madras	Somprampákam	6,000†	3,000†	Estimated.
,,	Red Hill	1,600	2,753	As enlarged.
Ceylon	Giant's Tank	6,380	2,750	As proposed.
,,	Kalawewa	2,300*	750*	Estimated. (Originally, with 20 feet head.)
Bombay	Sholapur	3,000	2,222	As enlarged.
,,	Vehar	1,394	1,728	As constructed.
Ceylon	Kantalai	3,584	1,500*	As restored, with 22 feet head.

From this it is seen that while undoubtedly the third largest in area, the Giant's tank is at least the fifth, and perhaps even the third, in capacity. The largest European reservoir has only half the capacity of Kantalai.

30. (*a*) Including the low ridge mentioned in paragraph 27, the embankment of the Giant's tank is 9¼ miles in length, and its present height at the low side of the tank is seven feet above the proposed level of the sluices. The work was not completed, and it is difficult to say how much the height would have been increased; but if the level at each end of the embankment can be deemed a safe criterion, the intended height may be estimated at 17 feet, which, in this special instance, would suffice for holding up 1,850 millions of cubic feet of water. According to the calculation in paragraph 25, however, a height of 19 feet would be needed, and it is noteworthy that some small portions of the bank on the 'spur' are within a few inches of this level. (The height of 17 feet was arrived at by comparing the *general* level at *each* end of the embankment.) It cannot therefore be said that the size of the tank would have been insufficient for holding the water which it is believed would have been secured in fairly good years.

(*b*) The breadth of base given to the embankment is enormous, the full width being 300 feet. The material on which it rests, and of which it is formed, is the clay composing the soil of the whole plain, excepting that along the spur above-mentioned (the top of which is for some distance too high to require raising) and for a very short distance on the opposite side of the reservoir the soil is of a more sandy nature. Excluding about a mile at the end near which the supply canal enters, and a mile and a half in which the natural ridge obviates the necessity for it, the inner slope of the embankment is partly faced with wedged and unwedged rubble, averaging rather more than a cubic foot in contents. Most of this pitching is water-worn gneiss, evidently brought from the Aruví-áru, but there are also many blocks of coral, which may have come from either Kalpitiya or Jaffna—the former 60 miles away; the latter, viâ Mantota, about 56 miles away. In its lowest portion, the line of the embankment follows a moderately regular curve for four miles. From the ends of the curve two straight sections run, one, a mile long, to join the lower end of the spur above-mentioned, the other, two miles long, towards the "Mullaittívu" end of the tank. Bending outwards, the latter again runs onward in a nearly straight line for about a mile more. By taking advantage of the 'spur,' and including it in the line of the bank, a saving of practically nearly a mile of earthwork was effected.

31. There are several breaches of insignificant size in the embankment, and two of moderate size, termed the "Periya Odeippu" and "Sinna Odeippu" (the big and little breaches), having respectively a breadth of base of 50 and 70 feet, their depths being 17 and 15 feet.

32. The remains of three unfinished sluices are visible, and there is presumptive evidence that the three largest breaches were the sites of others. Bricks are scattered round one, and if sluices were not inserted at the Sinna Odeippu and Periya Odeippu, the lowest part of the embankment, under which some of the most important village tanks lie, must have been without any. It may therefore be assumed that at least six sluices, but more likely eight, would have been built. Like the head-sluice in the Alavakka, they were of brickwork in mortar, on a foundation of wedged stones. At the most advanced one the construction of the *bisokotuwa* (which may be described as a square valve-pit, without valves, in the inner slope of the embankment) was begun.

33. There is no trace of any flood-escape. As in the case of the twin tank on the opposite side of the river, the work had not progressed sufficiently to need one at the high-water level.

* Estimated by H. P.
† Estimated by Colonel Baird Smith.

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34. Within the 16 feet contour are eleven villages of small size, at each of which is a very shallow tank of the usual style of the district, the largest covering, perhaps, 150 acres. The area of the fields under these tanks is stated in schedule No. 2 attached to this report,* to be 812 acres. In addition, the people have seventeen *távadiyúrs*, 'uninhabited villages,' (the term village having two distinct meanings: one always including, as in Sinhalese, the tank, fields, and the jungle within certain fixed limits, but not necessarily any houses; the other applying only to the hamlet). At each of these is a tank quite overgrown with jungle, and a field very rarely cultivated. In the event of the restoration of the Giant's tank, the villagers appear to be quite willing to take land below it in exchange for their fields in its bed, a small sum being paid to them as compensation for the loss of their houses. They admit that the change will greatly benefit them; for although their land is of slightly better quality than that under the tank the prospect of obtaining crops twice a year, instead of their present very precarious and irregular cultivation, is contemplated by them with considerable satisfaction.

35. The Giant's tank has no drainage area worth mentioning. According to the information received, the extent above the tank is less than half the area of the reservoir, and the soil of the higher tract being sandy, with a sub-stratum of gravel, little rain-water finds its way from the forest into the tank. There is no stream, and the villagers state that they have never seen water running down, except at one or two small foot-paths. "The ground drinks it," they say. At the lowest village tank in the bed of the Giant's tank one of the oldest inhabitants remarked that the greatest sudden rise of water-level which he had seen after continuous heavy rain, was about two and a half feet. The small relative size of the two main breaches, through which alone the true tank water (as distinct from that conveyed by the Alavakka) escapes, affords conclusive proof of the absenceof any excessive floods.

(5.)—*Irrigable Lands.*

36. The land more immediately irrigable by means of the Giant's tank constitutes fully half of the Mannár plain, being the portion enclosed between the Aruvi-áṛu, the sea, the Nay-áṛu, and the reservoir itself. Higher up the north bank of the Aruvi-áṛu land may also be irrigated by water drawn from the Alavakka. Here and there probably a few small local elevations are to be met with, to which water will not flow, but for practical purposes the whole district within the above limits may be deemed to be irrigable. Of this, a strip from half a mile to two miles wide along the coast is unsuitable for the cultivation of rice or other crops needing a good soil, although part of it is apparently well adapted for cocoanuts. Omitting this, but including a large tract to which water might be taken by a channel carried northwards from the reservoir, and which should not be reckoned at less than 10,000 acres, the whole extent lying naturally under the influence of the Giant's tank and Alavakka may be estimated to be about 60,000 acres. In addition to this, the plain extends far to the north of the Nay-áṛu, and, with sufficient water, much of the land in that direction might be irrigated by extending the northern channel for the purpose, crossing the Nay-áṛu by an aqueduct or syphon. Another of the storage reservoirs—the Kuray tank—was intended to furnish the means of irrigation to this northern tract, but the prospects of its repair are not at present encouraging from a financial point of view.

37. In schedules Nos. 1 and 3 attached to this report† it is shown that the extent of land already in private ownership, and formerly cultivated, is 12,370 acres, and that an additional 1,280 acres, which it is presumed can be irrigated, are also claimed. The area of all the tanks is roughly stated to be 8,986 acres, but as the távadiyúr tanks are of very little use even at the best of times, it is not proposed to employ them after the restoration of the Giant's tank. The other (village) tanks cover, according to the schedule, 6,180 acres. Including, therefore, these távadiyúr tanks, but deducting the total area of the fields inside the Giant's tank (1,338 acres), for which other land under the tank would be exchanged, the amount of Crown land available for cultivation is approximately as follows:—

Total area of Irrigable Land.		Acres.	Acres.
South of the Nay-áṛu	...	—	70,000
Deduct { Extent of land claimed or to be given	...	14,988	
Deduct { Extent occupied by village tanks	...	6,180	
			21,000
Total area of Crown land	...	—	49,000
Deduct { Unsuitable land near the coast	...	10,000	
Deduct { For local elevations ...	...	1,000	
			11,000
Crown land available for rice cultivation	...		38,000 acres.

* I am greatly indebted to Mr. Haughton for these Schedules, without which it would have been impossible to estimate either the water supply required or the probable return to be expected from the works. Throughout my stay in his district he has very kindly given me every possible assistance.

† The details of the Schedules are not printed.

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38. The schedules show that under the Giant's tank there are 91 village tanks, and 114 távadiyúr tanks, owned by 91 villages, containing 4,172 inhabitants in 1876.

39. With the low gradient of the surface of the plain the tanks are, unavoidably, miserably shallow, the deepest one being capable of retaining only about six feet of water. The better ones hold up from four to six feet, the water spreading out for a mile or a mile and a half above the bunds; and the depth of the shallower ones, in which are included all the távadiyúr tanks, ranges from one to four feet. Their areas vary from about 20 to 400 acres. The embankments are of the smallest dimensions, rising, as a rule, only a foot above the water-level, and sometimes only four inches above it; while the top width varies from three feet to less than three inches. The repair of all the tanks has recently been undertaken on the communal system, and a much-needed better state of things will shortly be brought about. The embankments enclose the tanks on three sides, and as the shape of the body of water contained is approximately a parallel-sided wedge, the mean depth must be half the mean maximum depth. Excluding the 'távadiyúrs,' the average mean depth of the village tanks cannot be much more than one foot eight inches, and the total capacity is thus about 450 millions of cubic feet. "Shallow evaporating pans," and also efficient filter beds, these village tanks nevertheless hold, under present arrangements, if full at the beginning of the year, sufficient water for the irrigation of 4,620 acres in the north-east monsoon. According to schedule No. 1, this is the acreage of the enclosed fields, which, as stated in my general report, are all now cultivated in very favourable years by means of rain-water stored in the village tanks.

Remarks.

40. The Giant's tank (or, rather, the whole scheme for the irrigation of the Mannár plain) is a work *sui generis*, perfectly original in its conception and general outline, and incapable of being fitly compared with other undertakings in the Island. In the other great works the difficulties to be encountered were, so far as my information goes, mainly in the details of construction; but in the case of the two Aruvi-áṛu reservoirs—the Giant's tank and the Akati-murippu tank—the design itself must have been the most formidable obstacle. That it should have been so successfully dealt with affords indubitable proof of the skill and patience devoted to the work.

41. All other large reservoirs in the Island are, it is believed, formed by throwing embankments across the valleys of rivers or streams, successive kings sometimes increasing the heights of the bunds;* and that the time-honoured custom was here departed from must have been due to special causes. It cannot be assumed that the talented engineer who designed these works—(and to whom, if my conjecture as to the date of their construction is correct, must be assigned the credit of designing the channel, 54 miles long, from Kalawęwa to Anurádhapura, and the gigantic Ælahára canal, that for 24 miles is described as having an embankment that is now from 50 to 90 feet high)—projected this scheme without the fullest investigation into the merits of alternative proposals; and one naturally enquires as to the reasons for a deviation from the accepted practice.

42. (*a*) These appear to be three in number. In the first place, had a reservoir been made in the Aruvi-áṛu valley itself, capacious enough to contain all the water needed for irrigating the lands on each side of the Aruvi-áṛu, for which it is presumed the two tanks were intended to furnish a supply, almost insuperable difficulty would have been experienced in dealing satisfactorily with the flood-waters. If made in the line of the river, a masonry dam to provide for their passage would require to be fully 400 feet long, and at the very least 65 feet high, a work that it is believed has been carried out in neither ancient nor modern times. At the ends of the embankment no rock on which to found it was visible, and a rock foundation was considered indispensable where large bodies of water were to be discharged. Even if trial holes had been sunk and rock had been discovered, the weir would have been fully 15 feet high, there would still have remained a difficulty with one of the sluices and its channel. If the sluice had been built near the end of the embankment, in the high ground beyond the weir, a very heavy cutting in hard gneiss would have been necessary, probably for a quarter of a mile—if not double that distance—with a depth at the crown of quite 30 feet. When wedging was the only possible method of mining—fire would have been of little use in such a cutting as this—this would have been an enormous labour. If the sluice were not constructed beyond the weir, but nearer the middle of the valley, the supply canal that was to run from it must inevitably have crossed the new line of the river, which of course would be diverted over the flood-escape, or weir.

(*b*) Secondly, the great distance of such a reservoir from the fields it was intended to irrigate would constitute a serious objection, which would certainly affect the selection of the site in the case of a tank supplied, as this would have been, by an irregular seasonal flow.

(*c*) Thirdly, it is almost impossible that unpuddled embankments of great height can be made water-tight,‡ and puddling was not practised by Siṇhalese engineers, except

* Abhaya-węwa (or Bassawak-kulam) at Anurádhapura, and Kalawęwa, N.C.P., may be cited as instances of this.

† *Vide* "Report by Messrs. Bailey and Churchill," as reproduced in the Irrigation Committee's Report, 1867.

‡ The breadth of base given to the embankments of both of the Aruvi-áṛu reservoirs seems to show that the engineer was well aware of the difficulty.

around masonry exposed to water. The design that, while equally effective, was the safest, as well as the most easily carried out, would naturally be preferred, even though involving more (but simpler) work than the other. In the good old days when the want of labour could easily be overcome and therefore was never really felt, and the cost of labour was but slightly felt, this was of little moment. This last objection may be thought to be inapplicable, seeing that many reservoirs in Ceylon have high embankments; but it should be remembered that these Aruvi-áru works represent the most advanced practice in the Island, and that the leaky character of most of the old bunds must have repeatedly caused the breaching of the tanks. Probably there is not a single water-tight ancient embankment in the Island.

43. Siṇhalese engineers have been fortunate in selecting sites for reservoirs, and the Giant's tank adds another instance to the many in the Island. If the position of the Tékkam be considered fixed, it would be impossible to effect any improvement of much value in that of the reservoir. Much evaporation and filtration of the water stored might have been obviated by reducing its area and increasing its depth, but in that case it would have been requisite to remove the anicut some miles up the river, with the probability of meeting with a less suitable site for it. The danger of leakage would also be increased, and much extra work in the supply canal would have been needed. Evidently an excessive loss by evaporation was looked upon as of no material consequence so long as it was believed that an adequate supply of water could be procured, and the Tékkam could be built on good rock. The practical inconveniences attending a greatly lengthened supply canal would also have some weight.

44. It is quite evident that the ancient Siṇhalese were our equals as regards accuracy of levelling. The table given in the Appendix (*Note* 1) and the fact that the two ends of the embankment, separated by 3½ miles of thick thorny jungle, are raised to almost the same height, although the intermediate portion is unfinished and several feet lower, leave no doubt on that point, and further proof is found at nearly every large tank and channel in the Island. There is no possible method by which the heights of these terminal points, the one not visible from the other, can have been discovered, except by actual levelling. How the levelling was accomplished is still undetermined, but it must have been a most laborious work, requiring an immense amount of care. Some years since, I found a Buddhist priest, at a secluded *pansala*, employing for the purpose a very long shallow wooden trough, having its upper edges planed 'true,' of triangular section, and filled with water, and it is most likely that in times past some such primitive but efficient apparatus was commonly used.

45. The outline of this and the other storage reservoirs plainly indicates that the engineer well knew the most economical line for an embankment on an inclined plane, viz., the semi-circle, and, on the whole, he has adhered to it with few modifications that are not rendered necessary or advisable by the contour of the ground. It is not easy to appreciate all the difficulties to be overcome in laying out in dense jungle a curve, even if a slightly irregular one, having a radius of a mile or more; but these are small compared with the still greater difficulty which must have been felt in ascertaining that this enormous tank would be of the required capacity. That it was ascertained in some manner or other is of course only an assumption, but it seems impossible that the capacity or area of such a vast reservoir could be even roughly *guessed*.* It would be unwarrantable to suppose that the construction was undertaken before at least *some* notion was obtained of the contents, and if it be admitted that the conclusion in para. 44 is justifiable, it cannot be deemed very improbable that sections were taken across the site before the design was finally decided upon. Plan-drawing was practised in the second century B. C. (*Vide* the account of the construction of the Maha Lowa Pásáda, at Anurádhapura.) The mode of carrying on the bund work shows, too, that all was arranged and set out before the actual construction was much advanced. No other legitimate inference can be drawn from the fact that the earth-work at the higher ends of the long embankment was proceeding at the same time as the earth-work in the (lower) central portion.

46. (*a*) There is no foundation for a belief that provision for the irrigation of the whole district lying between the Aruvi-áru and the Nay-áru was contemplated by the designer of the Giant's tank, and the head-works and canal were of inadequate size for securing, and the tank itself was too small to contain, the large quantity of water that such a project would demand. Though naturally much extension of cultivation was in view, the chief object was more likely to be the ensuring of a crop in favourable years over the then existing fields—of which doubtless only a small part was cultivated annually, as at present—and it may reasonably be assumed that these fields were either almost identical in area with the lands now owned by the inhabitants, or of not much greater extent. For these reasons:—(1) Without a large additional water-supply all the lands cannot possibly be cultivated in one year. (2) The village tanks are now of insufficient size to contain the additional water needed for the fields, and that they were formerly not larger than at present is certain, or some evidence of it could not fail to be perceptible on the ground. (3) As stated in my general report, too, any considerable increase in their capacity would

* After considerable practice in such estimating, my own guess at the area with a head of only 12 feet of water was 2,400 acres wrong! I thought the tank, with that head, would cover 3,000 acres!

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reduce the area of the fields. (4) Even if there are any abandoned village tanks in the irrigable district—of which I possess no evidence—it is at the same time likely that some of the távadiyúr tanks have been formed since the Tamil occupation of the district, and therefore subsequent to the construction of the Giant's tank.

(*b*) The assumption is further supported by analogy. A list of most of the more important tanks in the "Wanni Hatara-pattu," in the North-Western Province, and the extent of land under them, was compiled by order of King Wíra Parákrama Báhu—that is about 1,500 A.D.—"in order to prevent dissensions." It is, in fact, a registration of the total amount of land claimed by villages, and not necessarily the extent of land under actual cultivation, except in those special instances where all the land claimed was cultivated. On comparing the areas with those now cultivated or claimed under ordinary unabandoned village tanks, it is found that the cases in which there is any important difference are very few in number.

47. Taking, therefore, the area of fields now claimed as the extent of land primarily intended to be irrigated when the tank was designed, water would be needed for about 12,500 acres of land. Allowing an ample water-supply (at the rate usually estimated in Ceylon, viz., a cubic yard of water per square yard of land), the quantity of water wanted would be 60½ millions of cubic yards. It has already been shown (para. 25), that the channel, as designed, would (as nearly as can be estimated) have discharged 85 millions in a good average year, on which it is to be presumed the calculation was based.* But in such a year the village tanks would catch at least 10 millions of cubic yards of rain water. It may thus be concluded that in good average years a sufficient water supply would have been secured for ensuring the irrigation of all the fields lying under the tank, in addition to providing for a large increase, of more than 50 per cent., in the rice cultivation of the district; and therefore that the project would have fully answered the expectations of its projector.

48. When it is remembered that these works were designed and set out under disadvantages of which we can now have but a faint idea, few will be inclined to deny that the unknown engineer to whose skill they, as well as the Ælahára canal and the Kalawewa channel, are attributable, was one of whom any country would have very much reason to be proud. Instead of being the "stupendous monument of misapplied human industry" which it has previously been considered, a closer investigation shows at least one of the great reservoirs of Ceylon to present enduring evidence of the advanced knowledge, the skill, the energy, and the perseverance of the ancient Sinhalese rulers and their engineers, and of the comprehensiveness and enlightenment of their ideas. The hasty condemnation of the engineer who designed the Giant's tank, as a man who endeavoured to make water run up hill, or who projected a scheme which it was impossible to execute, and which he was compelled to abandon, has been merely an exposure of our own gross ignorance.

PART II.—GENERAL PRINCIPLES AND DATA.

49. *Principles.*—In preparing a design for the restoration or completion of the works at the Giant's tank, it appeared to me that no scheme could be thought quite satisfactory if it were not in accordance with the following principles:—

(1) A water-supply should be ensured sufficient, in dry years, for fully meeting the wants of the cultivators in both monsoons.
(2) A considerable extension of cultivation should be provided for.
(3) The works should admit of subsequent enlargement, if necessary, at no disproportionate cost.
(4) The head-works should be capable of diverting water to the Akati-murippu tank.
(5) There should be an unquestionable prospect of a fair interest on the total outlay.

Of these, (1) and (5) have been treated as essential; (2) and (3) seem to be almost indispensable if the works are to become as successful as may be anticipated; (4) is very desirable in view of the present extreme want of water experienced by the villagers living under the Akati-murippu tank, and of the large area of land suitable for irrigation on the south bank of the Aruvi-áru.

The scheme proposed in Part III. is believed to embody all these conditions.

50. *Expenditure of Water.*—Obviously, the first point to be ascertained is the volume of water required; but this is an amount regarding which 'authorities' are very far from agreement, their estimates of the quantity expended in the irrigation of one crop varying from about 50,000 cubic feet per acre of land under rice cultivation, to about 400,000 cubic feet. In Ceylon 'the usual custom' allows a storage of 130,000 cubic feet, in addition to the rainfall over the fields and tank, but this avowedly rests on 'the usual custom' in some parts of Madras a somewhat slender reed.

51. A little consideration, however, will convince any one that no hard and fast rule can be laid down, especially under the system of irrigation in vogue throughout the greater part of Ceylon, according to which the irrigated ground is constantly covered with water

* The enormous Padawiya, the Anurádhapura tanks, Galgamuwa tank in the North-Western Province, and many others—if not most tanks in the Island—may be adduced as proof that the tanks were not designed to impound the *minimum* rainfall, but at least the *average*, and in some instances (as Galgamuwa) the *maximum* fall.

until the crop begins to ripen. Only an insignificant part of this water passes into or through the rice-plants; for practical purposes all of it may be deemed to be absorbed by the soil, or evaporated. Thus it is evident that the amount of water expended will vary according to both the rate of evaporation in the irrigated lands, and the absorptive capacity of the soil; and to decide with any accuracy upon this quantity, these, as well as the physical environment, or external conditions, must be independently determined in each district. Until this is done, no comparison of much value can be instituted between the expenditure of water in various countries. (*Vide* Appendix, *Note* 4.)

52. *Evaporation.*—Returns of the calculated evaporation at several stations in Ceylon are published monthly by the Hon. the Surveyor-General; but although they are of much value as indicating (it is believed) the relative evaporative power of the atmosphere, they do not nearly exhibit the evaporation actually taking place.

53. To find the true rate of evaporation in the lands to be irrigated by the Giant's tank, direct observations of it have been recorded in the north-east monsoon, throughout the greater part of the time during which irrigation would be carried on. My duties unfortunately prevented the registration of these measurements for more than five consecutive months—from November, 1880, to March, 1881—and the occasional observations taken in other months cannot be utilized.

54. The observations were made at Parappan-kandal, which, while not much more than a mile below the Giant's tank, is centrally situated with respect to the fields. The mode of obtaining the data was somewhat faulty, but it was such as circumstances permitted. The water was retained in an ordinary zinc bucket, 12 inches wide at the mouth and 9 inches deep, sunk in the ground until its rim was an inch above the surface. The ground around it was thickly covered with short grass, and during the period of observation the adjoining soil was also always more or less moist; this tended to keep the lower portion of the bucket cool, and thus prevent any undue heating of the water. The water was not allowed to fall more than two inches before being replenished, and measurements were made daily, or sometimes once a week, as opportunity was afforded, with an ordinary plotting scale divided to fiftieths of an inch, special care being taken to avoid errors arising from capillary attraction. The error in reading could not be more than ·02 in., and as the water was renewed only five or six times in a month the total monthly accummulated error from this cause could never exceed ·12 in., even if the errors were all in one direction, or a daily average of ·004 in. Rainfall was measured in a Negretti and Zambra's 5-inch gauge fixed about three feet from the bucket, its mouth being one foot above the ground level. Further observations were taken in a small portion of the paddy-field, covering about 6,000 square feet, in which water was retained for the purpose so long as there was any likelihood of obtaining trustworthy results. This was for less than two months—from the early part of December to the beginning of February. On the assumption that the ratio between the rates of calculated and measured evaporation will not exhibit any excessive irregularity throughout the year, the observations furnish data for roughly calculating the actual evaporation of the district

55. (*a*) In order to ascertain the relation between this observed evaporation and that computed by the Hon. the Surveyor-General for Anurádhapura and Mannár—between which stations the tank is situated—a diagram was plotted, and it showed very plainly that the loss at the Giant's tank (= Parappankandal) corresponds to that at the former place. From the relative positions of the two places this is only what might be expected in the north-east monsoon. During the south-west monsoon the nearness of the tank and the fields to the sea cannot but cause their evaporation to adhere in some degree to the Mannár rate. As there is not a great diversity in the amounts for the two places their mean rate has therefore been taken as representing the *calculated* rate for the Giant's tank. Below are given the results of the observations, together with this calculated rate:—

	Observed mean daily evaporation in the sun in inches.	Calculated mean daily evaporation, in inches.
November	·080	·139
December	·131	·169
January	·110	·158
February	·205	·231
March	·253	·275
Total	·779	·972

(*b*) If this proportion is maintained throughout the year, the calculated mean Mannár-Anurádhapura evaporation for ten years, multiplied by 779 and divided by 972, will give the corresponding true evaporation for the Giant's tank. This co-efficient of reduction, $\frac{779}{972}$ may be written $\frac{209}{261}$.

56. At Madavachchiya (which is also a station in Northern Ceylon, 38 miles from the middle of the Giant's tank, and about 12 miles from Anurádhapura, with climatic conditions similar to those of the latter place) the daily loss of water in the tank during April and May, 1874, (no rice cultivation being in progress, and therefore no water being discharged) was ·305 in. With the same rate of absorption as at Parappankandal

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(para. 61) the daily evaporation becomes ·205 in. At Anurádhapura, the calculated daily evaporation for the same two months was ·261 in., and the calculated mean annual amount is 90·92 in.* In this case the co-efficient of reduction is $\frac{205}{261}$.

57. Taken the mean between the two fractions just obtained, the true co-efficient of reduction for the district becomes $\frac{207}{261}$. By employing this corrected multiplier the true monthly rates for the Giant's tank are deduced from the corresponding computed mean Mannár-Anurádhapura rates, as exhibited in the following table :—

Month.	Mannár-Anurádhapura.		Giant's Tank.			
	Calculated mean monthly evaporation in inches	Calculated maximum evaporation in inches	True mean monthly evaporation in inches.	True maximum monthly evaporation in inches.	Mean monthly evaporation in the field in inches.	Maximum monthly evaporation in the field in inches.
January ..	5·83	7·10	4·62	5·63	6·17	7·18
February ...	7·14	10·05	5·66	7·97	7·34	9·67
March ...	8·87	10·94	7·03	8·68	8·89	10·54
April ...	8·01	9·63	6·35	7·64	8·15	9·44
May ...	7·72	9·98	6·12	7·91	7·98	9·77
June ...	7·62	9·66	6·04	7·66	7·84	9·46
July ..	8·68	10·60	6·88	8·41	8·74	10·27
August ...	8·65	10·94	6·88	8·68	8·74	10·54
September ...	8·16	10·05	6·47	7·97	8·27	9·77
October ...	7·00	9·05	5·55	7·18	7·10	8·73
November ...	4·95	6·66	3·93	5·28	5·13	6·48
December ...	4·80	6·11	3·81	4·84	5·05	6·08
Totals ...	87·43	110·77	69·34	87·85	89·40	107·93

58. The Maḍavâchchiya mean evaporation, deduced from the Anurádhapura calculated rate, is

$$\frac{90{\cdot}92 \times 207}{261} = 72{\cdot}11 \text{ in.}$$

It was to be expected, *à priori*, that the rate at this station would be higher than at the Giant's tank. The south-west wind, which blows during the period of greatest evaporation, reaches it only after passing over many more miles of dry jungle than in the case of the latter.

59. Professor Haughton has recently advanced the theory that the rate of evaporation is as the direct sun-heat received, which he has shown to be (in the tropics) as the cosine of the latitude.* It is interesting to apply this as a check on the above calculations. Moderately trustworthy records of absolute evaporation under circumstances at all applicable to North Ceylon are available for but two stations in India—Bombay and Madras. Great as is the difference between the amounts, there is reason for believing that their mean may be used with some confidence for purposes of comparison with the evaporation of Northern Ceylon. Northern Ceylon, being relatively a plain of no great width, is exposed almost equally to the effect of the two monsoons, while each of the above Indian stations receives the full effect of but one—in one case the north-east, in the other the south-west; this may partly account for the disparity of their respective rates of evaporation. Like North Ceylon, too, they are at small height above sea-level.

60. The data for a comparison of their mean evaporation with that of the Giant's tank are :—

	Inches.		Inches.
Evaporation at Bombay ...	42·00	Cos. latitude of Bombay ...	·974
,, Madras ...	91·25	Madras ...	·946
Mean ...	66·62	Mean* ...	·968

and the cosine of the latitude of the Giant's tank being ·989, the mean evaporation becomes :—

$$\frac{989 \times 66{\cdot}62}{960} = 68{\cdot}63 \text{ in.}$$

61. Although the variance in the above-calculated amounts is extremely small—(1) between the two co-efficients of reduction ($\frac{205}{261}$ & $\frac{209}{261}$) & (2) between the three rates of annual evaporation (69·34 in., 68·63 in., and 72·11 in.), the observed data are so deficient that full confidence cannot be placed in the result; but in the absence of more satisfactory records the rate as shown in the table—69·34 in.—is perforce adopted as the true mean annual evaporation at the Giant's tank. (*Vide* Appendix, *Note* 2.)

62. Occasional measurements in the Parappankandal village tank at times when it was certain water was neither being transmitted to the field nor flowing into the tank—from October to January—gave invariably ·10 in. as the daily rate of absorption or filtration. Assuming this rate of absorption to be constant in the closely-adjoining field, the observations in the field (para. 54) showed a daily excess of evaporation over the other

* "Six Lectures on Physical Geography, 1880."

readings (in the bucket, which was 25 feet from the field) of ·04 in. in the cool weather, and ·06 towards the end of January. No information has been obtained as to the rate in the field during the south-west monsoon, there having been no cultivation in that season during my stay in the district. In order to come at the increased loss in that monsoon the amount recorded at the beginning of February has been taken to be the rate, though it is almost certainly slightly too small By adding these daily amounts the two columns in the table, of "evaporation in the field," are obtained. Whether the other observations are accurate or not, the monthly rates there given are nearly correct as regards the loss in the field during the north-east monsoon.

63. *Application.—North-east monsoon.* In my general report it was mentioned that water in some quantity might be drawn from the Aruvi-áṛu until the middle of January. Hence, for all water required after that date it is necessary to provide storage room, and the extent of this will depend on the amount of evaporation and absorption. Previous to January 15 the supply taken from the river will, it is presumed, more than compensate for any loss.

64. During the last north-east monsoon the cultivation at Parappankandal (which fairly represents the cultivation of the district), has been carefully watched. The sowing began on November 5, and ended about December 24, the mean date being November 30. Reaping began about February 13, and ended on March 20, the mean date being March 3. When all the land is under cultivation the sowing may end three weeks later; reaping will then last till April 14, and as the water supply is stopped about ten days before the crop is cut, the mean time of ending the flow will be March 4. The fullest allowance, as regards time, will have been made if March 12 be taken to be the mean date; in that case the reaping would be finished only at the end of April; that is, the crop would barely be gathered before the advent of the south-west monsoon.

65. According to this, evaporation over the whole of the irrigated land must be calculated from January 15 to March 12, a period of 55 days, and the most unfavourable seasons, in which the greatest loss and the smallest rainfall take place, should be provided for. By the last column of the table in para. 57 the maximum loss from this cause will be :—

$$\frac{7{\cdot}18}{2} + 9{\cdot}67 + \frac{10{\cdot}54 \times 12}{31} = 17{\cdot}34 \text{ inches.}$$

Absorption is also to be reckoned for the same period, and it will be 55 × ·10 = 5·50 inches. The total loss in the field from both causes thus equals 17·34 + 5·50 = 22·84 inches, or about 83,000 cubic feet per acre of surface exposed.

66. In the mean time evaporation and filtration will also have been operating in the Giant's tank and distributing channels. The loss in the channels, which will pass through comparatively dry ground, will be relatively great, but for want of *data* it cannot be calculated as yet. In the tank there will be the *absolute* evaporation, which will probably be slightly less than that given in the table, but the difference was not ascertainable at Parappankandal. Calculating the amount by the column for maximum *true* evaporation it becomes :

$$\frac{5{\cdot}63}{2} + 7{\cdot}97 + \frac{8{\cdot}68 \times 12}{31} = 14{\cdot}15 \text{ inches.}$$

The filtration will be 5·50 inches, and the total loss is 19·65 inches, or about 71,500 cubic feet per acre of surface exposed.

67. *Note.*—As it is not known that the rate of filtration is constant throughout the whole period of cultivation it will be advisable, until more has been learnt respecting the loss from this cause, to make some small allowance over the quantity above calculated. The maximum evaporation, and not the mean, must certainly be taken as the basis of calculation; the calculated maxima for ten years were recorded at Mannár in six months of 1872, and in another month of that year the maximum was all but reached. There is always a probability that high rates will occur for consecutive months.

68. *South-west monsoon.*—In this monsoon water may usually be obtained from the Aruvi-áṛu, but there is sometimes no flow of any kind; and as it is well known that the rainfall of this season is often a failure in Northern Ceylon, it is evident that water for the irrigation of at least a portion of this crop must be impounded during the north-east monsoon if the cultivation is to be party ensured. In such a fresh as that of 1880 the whole volume is little more than half the quantity actually needed, and even of that a considerable amount could not be secured when the water is at its highest. This being my own experience of the flow—in one year much less than the necessary amount, in the following year *nil*—further supported by evidence of its failure in several previous years within the last twenty, the conclusion is unavoidable that no reliance is to be placed upon it. As, however, the calculations are based upon the *maximum* evaporations recorded in each month during the last ten years, it is believed that quite sufficient provision for the cultivation will be made by securing in the north-east monsoon half the water required in the south-west monsoon. There is almost certain to be a sufficient surplus supply of water from the cold season, and the great cost of providing according to the above rates for the storage of the *whole* supply wanted for the second crops would, under present circumstances, prove practically prohibitive.

69. The estimate of all the cultivators and proprietors to whom I have spoken on the subject, except one, confirmed by Mr. Twynam's great experience, is that if an adequate

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water-supply be provided, half the area reaped in the early part of the year will be cultivated a second time in the south-west monsoon. Ploughing will then commence at the beginning of May, and the sowing will be finished about the middle of June, the mean date being May 23. The crop ripens in three months, and as the water-supply will be cut off ten days previous to that, the mean time of ending the flow will be August 13, the number of days being 82.

70. By the table, the evaporation in the field will be

$$\frac{8 \times 9{\cdot}77}{31} + 9{\cdot}46 + 10{\cdot}27 + \frac{13 \times 10{\cdot}54}{31} = 26{\cdot}67 \text{ inches.}$$

The absorption being $82 \times {\cdot}10 = 8{\cdot}20$ inches, the total expenditure in the field will be 34·87 inches, equivalent to 126,600 cubic feet per acre of surface.

71. In the Giant's tank evaporation and filtration will continue from March 12 to August 13, a period of 154 days. The former will be

$$\frac{19 \times 8{\cdot}68}{31} + 7{\cdot}64 + 7{\cdot}91 + 7{\cdot}66 + 8{\cdot}41 + \frac{8{\cdot}68 \times 13}{31} = 40{\cdot}58 \text{ inches.}$$

The filtration will be $154 \times {\cdot}10 = 15{\cdot}40$ inches, and the total loss becomes 55·98 inches, or about 203,300 cubic feet per acre of surface, an enormous but unavoidable waste. It would be more accurate to calculate the evaporation separately for each month, but as there is little variation in the rates for the different months, it will be a sufficient approximation to take the total evaporation over the mean surface exposed.

72. *Note.*—Some allowance should be made over the above amounts. The uncultivated land will be excessively parched, and (as regard the fields) will probably absorb more than the quantity measured in the north-east monsoon. From the same cause there will also be disproportionate loss in the distributing channels. The evaporation in the field may be rather more than has been estimated.

73. *Minimum Rainfall.*—In calculating the amount of water to be taken from the Aruvi-áru it will be safe to make some allowance for the rainfall in dry years. During a period of ten years the monthly minima registered at Mannár have been :—

	Inches.		Inches.		Inches.
January	0·00	May	0·00	September	0·00
February	0·00	June	0·00	October	0·81
March	0·14	July	0·00	November	2·34
April	0·00	August	0·00	December	1·18

The smallest—October to March—rainfall has been 9·60 inches, and the May to August fall 0·58 inches. The minimum in any *one* year has been

October to March	...	16·01 inches.
May to August	...	4·59 „

and the former is the fall that should be reckoned upon. There may be a less fall, but, if so, it will be at long intervals—perhaps of more than 20 years—and even then it is improbable that the fall will be *much* smaller. It is of no great consequence that the fall may sometimes be much under 16 inches in the north-east monsoon taken separately, seeing that, if the decennial period is a safe guide, the deficiency will undoubtedly be made good in the south-west monsoon, except on very rare occasions. As will be shown, sufficient water will be stored for much more than the crop of the north-east monsoon, and a few inches less rain in that season will make little difference, so long as the supply needed for the other crop is certain to be procured afterwards. The after compensation of rainfall will be mainly affected by an excess of evaporation and filtration, through the exposure of a total (in the two monsoons) greater water-surface than if the rain fell in only one season. With the available data, this increase cannot be accurately determined, and as the amounts concerned are small compared with those of the earlier period, it has been neglected. In the period between the two cultivations there will be a smaller loss in the Giant's tank, too, which will tend to reduce the increase.

74. In October, 1880, after 8½ inches of rain had fallen, succeeding an extreme drought,* some of the village tanks did not contain even a mere puddle, and none that were seen held more water than would have been absorbed in a few days. Hence it may be regarded as unquestionable that in such dry years which, unfortunately, are of too frequent occurrence in the district, nine inches of rain will be required for the preliminary saturation of the beds of the village tanks at the beginning of the north-east monsoon. This will leave seven inches of useful rain in them, or 25,000 cubic feet per acre, a quantity to be taken into account in solving the problem of the total volume of water to be procured from the Aruvi-áru. Although it is not proposed to fill the village tanks in the south-west monsoon, they will still be able to secure any rain that falls then, and so make good any deficiency in the earlier fall. The one-year minimum rainfall may thus be accepted in dealing with them.

* The rainfall at Mannár from April to September, inclusive, was 0·70 inches, according to the official returns.

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75. A less amount will suffice for saturating the bed of the Giant's tank and the fields, which will have been dry for a comparatively short time In their case it may be assumed that an average allowance of six inches for saturation will be quite enough, leaving ten inches to be utilized. This is equivalent to 36,300 cubic feet of water per acre, and the amount to be brought from the Aruvi-áru may be diminished accordingly. Some water will flow into the tank (as well as the village tanks), but the quantity in unfavourable years will be small. The ground on the high side of the village tanks is too flat for much water to escape off it, and it has already been stated that there is but a slight flow into the Giant's tank (para. 35). As part of the rain may also fall in the south-west monsoon (para. 73), it is not thought advisable to make any reduction on account of this additional water caught.

76. The minimum rainfall from January to March has been 1·66 inch, equivalent to 6,000 cubic feet of water per acre. This may be deducted from the storage needed in the north-east monsoon.

77. In the south-west monsoon no allowance of any kind can be made for the rainfall. The circumstances are not analagous to those of the other monsoon. Should there be the decennial minimum amount of rain (that is, 0·58 in., which is not worth considering) no after opportunity will be afforded of making up the deficiency.

78. The saturation of the fields must, however, be provided for. They will be dry for less than two months, and it is therefore assumed that four inches, equal to 14,500 cubic feet per acre, will be an adequate allowance on this account.

79. (*a*) *Maximum Rainfall.*—The greatest amount hitherto registered at Mannár in one day is 6·45 inches, but it is unlikely that this is the true maximum. The maximum fall is, of course, mainly needed as an all-important factor in the determination of the amount of flood escape required, and any error *must* be in excess. The irregularity in the fall throughout Northern Ceylon is great, and even though the annual amount received at Mannár is much smaller than at any other northern station, it would be unsafe to reckon upon much less than the greatest quantity recorded at any place of low elevation in the north or east of the Island. The uncertainty regarding it is plainly shown in the following table:—

	Annual rainfall in inches.	Max. rainfall in 24 hours.	Date.
Anurádhapura ...	51·05 ...	6·42 ...	Dec. 24th, 1877.
Mannár ...	32·80 ...	6·45 ...	do.
Puttalam ...	44·87 ...	7·14 ...	April 20th, 1875.
Trincomalee ...	60·00 ...	8·21 ...	Jan. 22nd, 1878.
Jaffna ...	41·94 ...	9·55 ...	Nov. 25th, 1875.
Batticaloa ...	57·80 ...	10·46 ...	Jan. 6th, 1878.

(*b*) The only conclusion to be arrived at after an inspection of this table is that during the period in which the records have been kept, at least the four, and perhaps the five first-mentioned stations have not experienced their greatest rainfall. This is in accordance with the measurements of the flood-discharge of the Aruvi-áru, which prove that throughout a great portion of the North-Central Province a much heavier north-east monsoon rainfall occurred in 1862 (before meteorological statistics were recorded) than in any subsequent year. The heaviest fall in 24 hours is therefore estimated at 10·5 inches, and this may give a maximum of six inches in one hour.

PART III.—RESTORATION.

Section I.—Proposed Works.

80. It should be noted that the nature and scale of the works needed for restoring the Giant's tank depend mainly on two considerations:—(1) the acreage of land to be irrigated, which is an arbitrary quantity; and (2) the ordinary minimum discharge of the Aruvi-áru, which is a fixed quantity.

81. The former has been settled by Mr. Twynam, the Government Agent for the Province, at 10,000 acres in addition to the lands now claimed. The schedules give the approximate area of these lands, including those inside the Giant's tank, at 14,988 acres, and the total extent to be supplied with water is thus about 25,000 acres. Of this amount, schedule No. 1 shows that the enclosed lands lying under the village tanks cover 4,620 acres. For those fields the village tanks now provide in *favourable* years, but under the new arrangements their capacity will be found to be insufficient in *unfavourable* years, which can alone be taken into consideration in designing the works. For the other lands—about 20,400 acres—additional storage room must be found.

82. *Storage Capacity.*—The available capacity of the village tanks has already been estimated at 450 millions of cubic feet (para. 39), and in the absence of detailed measurements this amount must necessarily be taken to be approximately correct. It may, however, be roughly checked as follows:—

If a "favourable" year is one with an average evaporation and rainfall (= 2·63 in.), the amount of water required, according to the preceding calculations, for the fields at

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present supplied by the tanks, from January 1 to March 1 (which is probably about the mean date of ending the water supply), would be :

For the fields, 4,600 × 70,500 =	324,300,000	
Loss in tanks, 3,100 × 59,000 =	182,900,000	
	507,200,000	
Deduct rainfall over ½ tanks and fields, 7,700 × 9,500 =	73,150,000	
Storage room required ...	434,050,000	cubic feet.

This seems to indicate that the estimate of the capacity of these tanks is not very inaccurate. When it is said that the water supply is "quite sufficient," it may safely be assumed that at the end of the cultivation there is an available surplus in nearly every tank.

83. Water can be obtained from the river until about January 15, and the works must be so arranged as to impound by that date all that will be required. The tanks being full at the beginning and (presumably) empty at the end of the period to be now dealt with, the loss in them by evaporation and leakage may be supposed to occur over half their surface. Assuming that they will be full at the middle of January, the amount to be stored in them for the north-east monsoon crop over the present enclosed fields will be :—

For the fields, 4,600 × 83,000 =	381,800,000	(para. 65)
Loss in tanks, 3,100 × 71,500 =	221,650,000	(para. 66)
	603,450,000	
Deduct rainfall over tanks and fields, 7,700 × 6,000 =	46,200,000	(para. 76)
Storage room required	557,250,000	cubic feet.

This leaves about 107 millions of cubic feet which the village tanks cannot hold, or water enough for $\frac{107 \times 4,600}{557 \cdot 2}$ = about 880 acres.

This shows that although in ordinary years (with an average evaporation and rainfall) the capacity of the tanks is sufficient, in unfavourable years (with a maximum evaporation and minimum rainfall) it must certainly be found inadequate. The difference between the amount now obtained and the estimated contents of the tanks is too great to be covered by any probable range of error.

84. In the other lands to be irrigated, which now equal 20,400 + 880 = (say) 21,300 acres, the storage will be

For cultivation, 21,300 × 83,000 =	1,767,900,000	(para. 65)
Loss in Giant's tank, 5,700 × 71,500 =	407,550,000	(para. 66)
Unavailable (below level of sluices) =	28,650,000	
Loss in distribution (say) ... =	25,000,000	
	2,229,100,000	
Deduct rainfall over tank and fields, from January to March ... 26,800 × 6,000 =	160,800,000	(para. 76).
Storage room required ...	2,068,300,000	cubic feet.

85. (*a*) During the south-west monsoon it is not proposed to fill the village tanks. As the minimum rainfall is practically *nil*, the water to be made use of will either be already in the Giant's tank or must pass through it, and it will be advisable to let all flow direct to the irrigable lands. The great loss by evaporation in the tanks will thus be obviated throughout the season in which it chiefly occurs, while the fullest advantage will be taken of their usefulness in catching local rainfall and impounding water for the principal crop. (*Vide infra*, para. 118 *et seq.*)

(*b*) Half the total area cultivated in the north-east monsoon—say, 12,500 acres—will be sown in this season, and as water for half of this is to be stored during the north-east monsoon the required capacity will be :

For saturation	6,250 × 14,500 =	90,625,000	(para. 78)
For the fields	6,250 × 126,600 =	791,250,000	(para. 70)
Loss in Giant's tank	3,000 × 203,300 =	609,900,000	(para. 71)
Loss in distribution (say)	... ... =	25,000,000	
Storage room required	.. ...	1,516,775,000	cubic feet

86. Thus the total amount of storage room needed is

For fields supplied by village tanks	450,000,000	(para. 82)
For fields supplied by Giant's tank in north-east monsoon,	2,068,300,000	(para. 84)
For fields supplied by Giant's tank in south-west monsoon,	1,516,775,000	(para. 85)
Total ...	4,035,075,000	cubic feet.

87. *Additional water required.*—In the driest years the rainfall available for cultivation in the north-east monsoon has been stated to be 10 inches in the fields (para. 75). It will, however, be necessary to provide more water than this previous to January 15, though no additional storage room will be wanted for it. The evaporation before the middle of January will be $\frac{24 \times 6{\cdot}08}{31} + \frac{7{\cdot}18}{2} = 8{\cdot}20$ inches; while the filtration will be $39 \times {\cdot}10 = 3{\cdot}90$ inches,—a total of 12·10 inches, or about 44,000 cubic feet per acre. The water wanted will be

For cultivation ...	25,000 × 44,000 =	1,100,000,000	
Deduct available rainfall ...	25,000 × 36,300 =	907,500,000	(para. 75)
Water wanted ...		192,500,000	cubic feet.

88. (*a*) The village tanks will be half filled early in November—(say) by November 5 at the latest—and will be filled up about December 20. Being kept full up to the middle of January, evaporation and absorption must be reckoned up to January 15. The filling cannot be longer deferred, or it may be impossible to secure enough water.

(*b*) Evaporation before December 20 will be $\frac{5{\cdot}28 \times 25}{30} + \frac{4{\cdot}84 \times 20}{31} = 7{\cdot}52$ inches; and absorption being $45 \times {\cdot}10 = 4{\cdot}50$ inches, the loss will be 12·02 inches, or 43,700 cubic feet per acre, over (say) a third of their surface.

(*c*) From December 20 to January 15, the loss will be:—Evaporation $\frac{4{\cdot}84 \times 11}{31} + \frac{5{\cdot}63}{2} = 4{\cdot}54$ inches, and absorption $26 \times {\cdot}10 = 2{\cdot}60$ inches, a total of 7·14 inches or about 26,000 cubic feet per acre, over (say) their whole surface.

(*d*) The two amounts are equivalent to a loss, over their whole surface, of 40,600 cubic feet. Hence, the waste is

Waste in village tanks ...	6,300 × 40,600 =	255,780,000	
Deduct available rainfall ...	6,300 × 25,000 =	157,500,000	(para. 74)
Water wanted ...		98,280,000	cubic feet.

89. The filling of the Giant's tank will be gradually progressing during the same period, and loss from the same causes will be taking place in it also. This will be:—Evaporation, $\frac{5{\cdot}28 \times 25}{30} + 4{\cdot}84 + \frac{5{\cdot}63}{2} = 12{\cdot}06$ inches, and absorption 71 by ·10 = 7·10 inches,—a total of 19·16 inches, or about 70,000 cubic feet per acre. The total becomes:

Loss in Giant's tank, ...	5,000 × 70,000 =	350,000,000	
Deduct available rainfall ...	6,400 × 36,300 =	232,320,000	(para. 75)
Water wanted ...		117,680,000	cubic feet.

90. Thus the additional water for which no extra storage room is necessary is:—

For the fields ...	192,500,000	(para. 87)
" village tanks ...	98,280,000	(para. 88)
" Giant's tank ...	117,680,000	(para. 89)
Total ...	408,460,000	cubic feet.

91. *Total water required.*—The whole volume to be obtained from the Aruvi-áru is now arrived at:—

To be drawn and stored	4,035,075,000	(para. 86)
To be drawn, but not provided with extra storage room	408,460,000	(para. 90)
Total ...	4,443,535,000	cubic feet.*

92. *Remarks.*—In these calculations there are obvious probabilities of error from many sources, but at present they cannot be eliminated. The two main factors—the maximum north-east monsoon loss in the fields and in the tanks—are, however, thought to have been ascertained with an adequate approximation to accuracy. The former depends

* According to the usual allowance in Ceylon, 4,810 millions of cubic feet of water would be needed in addition to the rainfall.

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primarily on direct measurements of the actual loss; and the error in the latter is on the safe side, and cannot be in *defect*. The excess of the maximum over the mean evaporation, too, is so very considerable that it is believed a water-supply provided as above estimated would be found to be *amply* sufficient. It is almost impossible that the maximum rates of evaporation for the last ten years can recur in each of the ten consecutive months—from November to August—during which the cultivation will be carried on; and even in the driest years *some* water must run off the surrounding jungle into the tanks.—(*Vide* appendix, *Note* 3.)

93. *Available water-supply.*—The mode of obtaining the needed supply is regulated by the flow of the river. The total volume of the flow illustrated by the diagram is 1,750 millions of cubic feet, which passed down the river in nine days: and three similar freshes give 5,250 millions in twenty-seven days. As the discharge continues from the beginning of November to the middle of January, the average minimum flow would last for fifty days, giving, at 200 cubic feet per second, about 860 millions of cubic feet. The total ordinary-minimum discharge of the Aruvi-áru in the north-east monsoon (excluding the two specially small discharges of the last twenty years—para. 9), may thus be put down at about 6,000 millions of cubic feet. This is probably not very far wrong; the maximum volume of the freshes, on which the amount of the discharge chiefly hangs, has been measured; the intermediate flow is, unavoidably, only estimated.

94. The figures above given make it quite evident that in order to irrigate the required extent of land, measures must be taken to catch a considerable part of the water that comes down the river in very unfavourable years—the years in which there will naturally be the most urgent demand for it; and manifestly it is out of the question to endeavour to secure it simply by means of an anicut and canal, unless at enormous cost. In such a case it would be necessary to give the canal a discharging capacity approaching the volume of the floods, that is some 5,000 cubic feet per second. To do this, much rock cutting would certainly be encountered, and the relative cost of future enlargements of the canal would be quite prohibitive.

95. *Catch-water reservoir.*—A catch-water reservoir in the Aruvi-áru valley has therefore been designed for the purpose. Being constructed across the river, it will receive all the water flowing down, whatever its amount. Its main object is to delay the floods as much as possible—to hold back part of their volume—so as to make the canal to the Giant's tank to carry them off; but it will also act as a secondary storage reservoir, and so permit a reduction of the head of water that must otherwise be retained in the Giant's tank.

96. The smallest allowable capacity of this reservoir is obtained as follows:—

The diagram of an ordinary-minimum flood shows that a canal discharging 800 cubic feet per second will take 534 millions of cubic feet of such a flood: three floods will give 1,600 millions of cubic feet. It will also catch all the intermediate flow, viz., 860 millions of cubic feet. The total needed supply being (say) 4,445 millions, the reservoir must secure the remainder, viz., 1,985 millions. This will be impounded during three floods, and the amount to be held back at each will thus be 662 millions. As designed, the available capacity of the reservoir is 898 millions of cubic feet (and considerably more if the river, above the reservoir, and the numerous streams and hollows be taken into account). It is deemed advisable to make it of this large capacity in order to reduce the work at the Giant's tank, and in order to hold back water for filling the Akati-murippu tank.

97. The site selected for the catchwater reservoir is about 25 miles from Mannár, on the Madavachchiya road, and, as shown on the plans, the embankment will cross the valley at the 25th mile-post from Mannár. At this point a small spur from the northern side extends towards the river, a lower spur running to meet it from the opposite side of the valley. The two materially reduce the width of the valley at the spot. Above the embankment the valley expands considerably, but the ground is very rough for some distance on each side of the river, and all the higher contours are excessively irregular. Those shown above Vannankallu on the plan are little more than sketched, but below that point they are approximately correct. Great difficulty was experienced in fixing their positions, the irregularity of the surface often rendering it impossible to distinguish the true ground level for ten, and sometimes even twenty consecutive chains. It was at first believed that the spur at 24½ miles would prove the better site, but on laying the work down that now recommended is found to be superior in many respects. Before the change of design, however, much time that might have been given to the contours higher up the river was spent on ground which will now be far outside the embankment.

98. In the bed of the valley the surface soil is clay throughout, for several feet in depth, in general appearance much like that nearer the sea, and rock lies, as a rule, some twelve or fifteen feet below it. The higher sides of the valley and the spurs alluded to consist of red sandy soil on the surface, with the usual gravel of Ceylon a foot or two below. Immediately under this is gneiss, decomposed on the top, but very solid after a few feet have been removed.

99. That portion of the reservoir lying on the south side of the river, above the Tékkam, is in the North-Central Province, the rest of it being in the Northern Province. Almost all the bed is now covered with thick thorny jungle or forest, the latter of very small value. One village, Kunjukulam, in the Northern Province, with its tank and

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field, is immediately in the new line to be taken by floods after leaving the reservoir. It is proposed to give the inhabitants land under the Giant's tank in exchange for their present fields, as in the case of the people now living in the bed of the Giant's tank.

100. The length of the reservoir will be about 3¼ miles, and its greatest breadth 2¼ miles. Its other dimensions are approximately as follows :—

Depth at sluice in feet.	Area of water surface in acres.	Capacity in millions of cubic feet.	
At sluice level	170	4·00	(unavailable)
5	590	82·75	(available)
8	930	182·05	
10	1,290	278·75	
12	1,760	411·60	
14	2,186	583·48	
16	2,530	784·75	
17	2,670	898 00	

Total capacity, 902,000,000 cubic feet.

101. The embankment, which will have a length of 1⅞ mile, crosses the valley somewhat obliquely. It will be 26 feet high in the ground near the Aruvi-áṛu and 56 feet high at the river itself, with a top width of 8 feet, and side slopes of 3 to 1 and 2 to 1. The puddle will of course rest upon rock throughout. At the river crossing and in the Sittáṛu (which is also crossed) the rock is hard and solid, with an appearance (at the surface only) of slight stratification, the layers being nearly vertical and running almost parallel to the line of the embankment. It is not proposed to pitch the face of the bank until the necessity for doing so is proved. Its line forms an acute angle with that of the only wind which can injuriously affect the earthwork—the north-east—and as the valley is shut in by adjoining higher ground, and winds have now but small effect in it, the heavy expense of facing the inner slope with stone will probably be found to be unnecessary. The reservoir also will never be full for any great length of time, and the embankment will therefore be well covered with grass.

102. To permit the rapid passage of the surplus water of the maximum floods of the Aruvi-áṛu an escape of great discharging power is necessary. As there may be an occasional flood during the construction of the works, some provision will also be needed for keeping open a temporary waterway in the lowest ground. After a careful consideration of these essential points only one waste weir has been designed, as shown on the plan and drawings, on the southern spur against which the embankment will abut. It is proposed to employ the Sittáṛu as a temporary waterway until the river has been blocked up and the rest of the work has progressed to a sufficient height, an additional escape being left open for ten or fifteen chains on the south bank of the Aruvi-áṛu, where the ground is somewhat rocky and gravelly. The Sittáṛu would then be filled up during the dry weather of June, July, and August, when there is no flow in the river. After this work has reached the ground level the sluice would act as an efficient waterway in the case of small flows. It seems to me that, considering the circumstances, there would be less danger of *expensive* accident in carrying out the works in this manner than in adopting any other method. Should a *heavy* flood occur while the Sittáṛu is being filled up, *no* temporary waterway that could be formed would discharge it; but there is small danger of such an occurrence in the dry season, and at the very worst the damage which it would effect would be confined to the comparatively small amount of earthwork then deposited in the Sittáṛu—damage that could be made good in a week or two with a sufficient labour force. The only other safer method—(if it would really be safer, which is very doubtful)—would be to construct a waste weir in the Sittáṛu, leaving it several feet lower than the earthwork, as the construction of the embankment progressed. But this would still provide for the passage of merely ordinary small floods, while the cost would be equal to that of filling up the Sittáṛu with earth and puddle several times over. The great height to which it would be necessary to raise this weir (some 39 feet) would be very objectionable in view of subsequent heavy floods.

103. The proposed weir will be 700 feet long, and will rest upon hard compact gneiss. It will be formed almost entirely of Portland cement concrete, with the exception of the upper two feet, which will consist of one course of stone-on-edge laid in cement. For this course it is proposed to utilize the best stones of the old Tékkam, which is not very far distant. Wing walls will protect the ends of the embankment north and south of the weir. I am not in a position to state that the site, as shown on the drawings, is the best one; this can only be known when the excavation of the puddle-trench has bared a considerable surface of the underlying rock. It is not intended to lay the upper two-feet course until the soil on the low side of the weir has been mostly cut away, which will probably be the case after the first season's floods have passed over the weir.* The average height of the weir is estimated at twenty feet, but it is almost certain to be considerably less, especially at the south end. No borings were made at the site. They would have stopped at the

* *Vide* Appendix, *Note 5*.

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upper-lying decomposed rock, which is known, by an examination of neighbouring streams, to be not more than fifteen feet below the ground level, and they would thus have furnished no information regarding the depth at which compact gneiss is to be met with. To divert ordinary small floods from the foot of the retaining-walls on the low side the extreme ends of the weir will be carried up, at an incline, to a height of two feet above the rest of the work. The upper face of the weir will be protected by large pitching, as shown.

The maximum flood discharge of the river has been stated to be 32,000 cubic feet per second, and this quantity would pass over the weir under a head of about five feet six inches, or possibly rather less.

104. The only other important work at this upper reservoir is the sluice. According to para. 96 the channel to the Giant's tank must convey 800 cubic feet per second, and this should be the discharging power of the sluice under about half the full head of water. Assuming that 4 feet by 2½ feet will give a useful working size for the valves, the required discharge will be given by five valves under a head of 10·4 feet over their centre. In case of any temporary injury to one of them it has been thought advisable to provide six of these valves. With a full reservoir they will be capable of discharging 1,180 cubic feet per second, without allowance for velocity of approach. As in the case of the waste weir the exact site of the sluice will be fixed after the puddle trench has been opened, the portion of the trench below it being filled up with cement concrete, into which the puddle will be "tongued" as shown. Were the sluice fixed at the end of the embankment, an enormous and very expensive cutting would be unavoidable. Several styles of sluice have been examined into, but that usually adopted in Ceylon offers so many advantages that there can be little doubt as to its being the preferable one for all but very high sluices, whether for economy, efficiency, or subsequent facility of examination.

105. (*a*) The Mannár-Madavachchiya road and the minor road from Vavuṇiyá-Viláṇkulam to Silávaturai run through the bed of the proposed reservoir—the former for two miles, the latter for one and a half mile. The former may be carried round the north-side of the reservoir without difficulty; it is not a "made" road, and it runs only on the natural surface of the ground. A bridge of 40 feet span and four or five culverts will require re-erecting.

(*b*) As for the minor road, there appears to be no reason why carts should not diverge from the Mannár road at Kombansayintakulam—at the 19th mile—crossing the Aruvi-áru by an already existing road and ford which would merely need a little improvement. Only one very small village would be missed in such a case, and the present traffic along the road is of the smallest. The erection of a special bridge for this road, over the Alavakka, will thus be obviated.

106. In accordance with the fourth principle on which the design is prepared, these head-works should be capable of diverting water to the Akati-muripp tank on the south bank of the river. This will easily be effected by means of a simple sluice, to be built at small cost when required, at the south end of the embankment. As the ordinary flow of the river will all be taken to the Giant's tank, the Akati-muripp tank must secure its supply of water only during floods, with the assistance of the large extra capacity given to the upper reservoir (para. 96). The level of the sluice for Akati-muripp will thus be little below that of the waste-weir, and this will permit a great reduction in the amount of excavation needed in the channel to be cut from it to the tank, in addition to the saving in its upper mile. Of course the opening of the latter portion—the section lying between the Tékkam (which will be nearly in the middle of the new tank) and the embankment of the new tank—will be dispensed with.

107. A point regarding which no local data have been obtained is the rate of silting up of this proposed reservoir. It was not until long after the last floods had passed down the Aruvi-áru in the north-east monsoon of 1880–1881 that the want of any upper reservoir was ascertained; and no measurements of the silt-discharge have since been possible during my stay in the Province. That floods will bring down a considerable amount is beyond question, but, judging by analogy, the rate of deposition in such an extensive reservoir will be comparatively very slow. It will be long before even the deep river-channel and other hollows will be filled up. None but the very finest particles of silt will ever reach the embankment, the heavier matter in suspension being of course dropped a mile or two away when the river water enters the tank and becomes part of the quiescent sheet covering it. At Padawiya tank, which is supplied by two small rivers, both of which bring down much silt—a tank that was in working order for fully 900 years—any evidences of silting up are not perceptible at the embankment. The Aruvi-áru floods are of such short duration that the rate of filling up may be expected to be at least not more rapid than at other similar reservoirs, and in any case an ample margin is allowed for it.

108. *The Supply Canal, or Alavakka.*—The canal will begin at the new sluice. Its dimensions are mainly decided by three considerations:—

(1) The velocity and quantity of water to be discharged.
(2) The present state of the work.
(3) Facility for its enlargement.

To keep the velocity low, the gradient has been fixed at 1 in 7,500. The side-slopes being 1½ to 1, and the greatest safe velocity being about two feet per second, the formula $V = C\sqrt{RS}$, with Kutter's co-efficients, requires a breadth of base of 70 feet, and a depth

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at which water must flow of 5 ft. 6 in., in order to obtain a discharge of 800 feet per second; and these dimensions are proposed to be adopted.

109. A new section 2,100 feet long will connect the sluice of the upper reservoir with the Alavakka, meeting the latter at a quarter of a mile beyond the Sittáru breach, the repair of which will thus be avoided. At a short distance below the sluice it is proposed to construct a gauge-basin for measuring the out-flow. This will be mostly in cutting, the excavated soil being utilized for the embankment of the reservoir. No drawing of it has been prepared; its size and shape will partly depend on the quality of the material to be excavated. Should the latter prove to be of good quality, so as to be economically utilizable, it will be desirable to make the basin of large dimensions, say 200 feet square. This gauge-basin will be needed for enabling the guardian to regulate the discharge of the sluices correctly.

110. On the way to the Giant's tank the canal will receive the surplus rainfall of the adjoining higher ground. The bank that runs along the low side has therefore been drawn with a top 6 ft. wide and with side slopes of 2 to 1. Escapes for surplus water are provided near the breaches, and at the breach formed by the largest stream a silt trap is designed. The sand, &c., caught here will be discharged down the stream by means of a sluice to be built in the embankment of the canal. Beyond this point the streams are very small, and the amount of silt appears to be insignificant. The bed of the canal having already an inclination greater than the required gradient, very low falls will be built across it, as shown, to reduce the slope to 1 in 7,500.

111. On arriving at the plain the Mannár-Madavachchiya road is crossed, and a bridge will be needed at the spot. That shown on the drawings is a continuous girder in two fifty-feet spans, the ironwork being 4 ft. 6 in. above ordinary water-level. Beyond this bridge little earthwork is encountered in the canal itself, but the bank will need raising in places. Before entering the Giant's tank much of the water will leave the line of the Alavakka and spread through the jungle; in the lower part of the course this will not be undesirable, as obviating the necessity for more falls. An outlet, marked "Kalingula" on the plan, will be wanted at 17½ miles from Mannár for supplying water to the highest fields. This will also act as a flood escape, over which there will be a road-bridge.

112. *The Giant's Tank.*—The capacity to be given to the Giant's tank is determined by those of the catchwater reservoir and the village tank. That of the former being 898 millions of cubic feet, and of the latter 450 millions, the total is 1,348 millions The total storage room required being 4,035·075 millions (para. 86), the Giant's tank must therefore hold (say) 2,688 millions of cubic feet. With a head of 16 feet of water its capacity has been shown (para. 28) to be 2,750·54 millions—a surplus of 62½ millions. This seems a small surplus, but the expense of increasing the height of the embankment will be great, and if the works prove as successful as may be anticipated, such an increase would not remove the necessity for a future enlargement; while, if they prove less successful, the increase will not be needed. The head of 16 feet is therefore proposed to be adopted.

113. According to the submitted designs the height of the embankment above high-water level will be 4 ft. 6 in., its top 8 feet broad, and the side-slopes 3 to 1 and 2 to 1. Including the spur previously described, the length along which work will be needed will be ten miles. The re-laying of all the old pitching will be indispensable. In the north-east monsoon the wind would probably cause little or no damage, but in the south-west monsoon the experience would be very different unless the face were protected. Fortunately, the south-west wind will only catch a portion of the bank. This wind blows so strongly that I have sometimes found it not a very easy matter to remain steady on the top of the present low embankment. In that season the water will usually be low, but when a good flow takes place in the Aruvi-áru much of it will be secured, and it will doubtless often happen that the tank will be full then. Unless the pitching be re-laid waves may certainly be expected to cause erosion at such times. It is difficult to say how much stone is now on the embankment, some of it being covered with soil, and most of it with jungle; but after a careful examination I estimated that, making allowances for what cannot be seen, there will be enough to permit an average breadth of 25 feet of pitching to be laid near the water line along all the deeper part of the bank, and perhaps more in the portion exposed to the south-west wind. With the small head of water to be retained, this will probably be found to be enough; when the water falls very low the embankment itself will afford some shelter. The expense of bringing more stone from the river, which is six or seven miles from the deeper part of the tank by the best route, would be great, and may, I think, be dispensed with.

114. Eight sluices will be wanted at first, and perhaps two more afterwards. The old sites, with two intermediate ones, seem to be the most suitable, and doubtless this will be found to be the case when a survey of all the irrigable land has been prepared. With a minimum head over their centre of 10 feet these must be capable of supplying water to all the lands in the driest times. Valves, three feet by eighteen inches, will therefore be required in order to leave a good working margin. When the reservoir is full their total discharging capacity will be 780 cubic feet per second. The sluices are designed so as to be capable of being safely raised three or four feet, and it is proposed to build them of brickwork on a foundation and flooring of cement concrete.

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115. (*a*) A waste weir of comparatively small dimensions will be amply sufficient for the Giant's tank. The maximum rainfall in one hour has been estimated at six inches (para. 79), and it will of course raise the water-level to that extent. In addition, there will be a flow off the drainage area, estimated to be some 3,000 acres in extent. If, at a most liberal allowance, two-thirds of the rain come off this land into the Giant's tank, the water-level will still have been raised only ten inches.

(*b*) The greatest fall in 24 hours may be 10·5 inches. This might increase the depth by 18 inches. But for it to elevate the surface above ordinary high-water level the head previously impounded must be within 18 inches of that level. Though possible, it is unlikely that this will be the case; at any rate, there is no reason to anticipate that the necessary combination of circumstances will occur more than once or twice in a century, for the tank will rarely be full until late in December. It is not to be expected that such a rainfall will occur at more frequent intervals, and there will still remain the probability against the presence of the second factor. Even if the tank had previously received its full amount, the top of the embankment would still be three feet above water-level. So that, so far as such a downpour is concerned, no provision of a waste weir is necessary.

(*c*) Similarly, a special flood escape is not needed for discharging the maximum *monthly* fall. The greatest monthly fall registered in North or East Ceylon has been 30·35 inches.* At Mannár the maximum has been 18·11 inches. Taking 31 inches as the true maximum‡ and assuming the head in the reservoir to be up to ordinary high-water at the beginning of the month, the surface would be raised 51 inches. In the meantime the sluices would be discharging the water. A depth of 51 inches over ordinary water-level would give a volume of about 1,200 millions of cubic feet to be discharged, and the sluices could pass this in 18 days—on the average much more rapidly than it would fall.

(*d*) The only discharge, therefore, to be provided for is that of the water conveyed by the supply canal, which might be running full at the time of these heavy rains. In such a case it would deliver 800 cubic feet per second, which a weir 134 feet long would discharge under a head of 18 inches, leaving the top of the embankment still three feet above the water. The waste weir, as designed, will be 300 feet wide, and there seems to be no doubt as to its adequacy, in conjunction with the sluices, to keep the water within safe limits.

116. *Future Extensions.*—In designing the whole works, the third principle—that the works should admit of subsequent enlargement at moderate cost—has been kept constantly in view. By raising the embankment of the Giant's tank two feet, an additional 550 millions of cubic feet of water might be stored, and the upper reservoir will be already large enough to catch the water. This would provide for the irrigation in each monsoon, according to the previously calculated rates, of nearly 6,000 additional acres of fields, at a cost of probably one and a half time the upset price of the jungle.

117. For further extensions it would be necessary to increase the discharging powers of the supply canal, as well as to enlarge both the reservoirs. In the case of the upper one the large waste weir now designed would tend to keep down the cost materially. It would probably be found that *all* the ordinary-minimum supply brought down by the Aruvi-áru might be utilized for the lands under the Giant's tank, and the Akati-murippu tank at remunerative rates. The land is available, and the water can be *made* available; the only desideratum is an abundant population, and that is the deficiency most easily remedied, and one which time assuredly *will* remedy. It may be said that when fully developed the Aruvi-áru works, as designed, will provide for the full irrigation of nearly 50,000 acres of land, at a good profit to both the cultivators and Government.

118. *The Village Tanks.*—Various suggestions have been made respecting the mode of storage to be adopted in the case of the water needed for the lands lying under the village tanks, but all are broadly separable into two:—

(1) That the tanks should be done away with, and the water required for their fields be impounded in the Giant's tank.

(2) That the tanks should be retained, and (when the rainfall proves insufficient) be filled up by water drawn from the river.

The financial aspect of this question will be entered into in considering the "Prospects of Revenue," but its bearing in other respects may here be dealt with.

119. Two reasons are given for urging the abolishment of the village tanks:—

(1) A desire to avoid the present excessive waste of water in them by evaporation.

(2) A wish to render possible the cultivation of the area of rich soil now forming their beds.

The question of relative cost does not appear to have been alluded to.

120. The village tanks and távadiyár tanks have formerly been treated as of one class, but it is preferable to separate them. The inhabitants of the district depend entirely on the former; crops are obtained under the latter not more than once in ten years, it is said, and they have never been known to hold up enough water for full cultivation, for which,

* At Jaffna. ‡ Although this is equal to the annual mean fall at Mannar!

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indeed, their capacity is altogether inadequate. In fact, they can only be utilized in exceptionally favourable years. It seems, therefore, to be almost useless to endeavour to employ them after the restoration of the Giant's tank; in any case the greater part of the water wanted for their fields must be stored in that reservoir, and the quantity is so small that if the whole of it be so stored there will be but slight increase in the cost of the works. Provision has therefore been made for impounding all the water wanted for their lands in the storage reservoirs.

121. Respecting the other village tanks, the circumstances are different. Being in the natural course of the rainwater—in valleys, if depressions in the plain two or three feet deep may be so termed—and each tank being almost immediately below the field of the upper one, they catch nearly all the surplus rain of the district, which in ordinarily-good seasons (on an average, about once in two years) is sufficient to fill them during the north-east monsoon. If they are quite full at the end of the year, this water is enough for the irrigation of the fields at present enclosed under them. However shallow and useless they may appear, the fact is undeniable. The villagers all adhere to it, and my own observations support it. This year (1881) they were full on January 17, and in every tank seen by me there was a considerable surplus after the rice cultivation was ended although in each instance very nearly all the open field had been sown. Clearly, the first effect of giving up these tanks will be the loss of all the local rainfall which they would have stored. Yet it was to avoid the present waste of only a *part* of this water that their non-retention has been advocated.

122. It may be urged that this water will not be needed after the Giant's tank and Alavakka are in working order, but this would be an error—at any rate if the project for merely *completing* the ancient works be adopted. Had the Tékkam and Alavakka been restored they would certainly have failed to secure the water needed for all the lands to be irrigated during the 1880–1881 monsoon, in which season all the village tanks were filled up by the local rainfall. I believe the result would also have been similar in the previous north-east monsoon.

123. If the larger project now recommended be adopted, the local rainfall caught in the tanks will *probably* not be needed, and so far as that is concerned the tanks might perhaps be dispensed with. But the 450 millions of cubic feet of water which they impound must be stored somewhere, and the only other places for it are the two storage reservoirs. An additional expense must therefore be incurred for the purpose, and I quite fail to discover that the slightest benefit would be derived from the work. Undoubtedly no waste of water will be obviated, no additional cultivation will be provided for, not a rupee of additional revenue will accrue to Government. An excessive evaporation and absorption (in the tanks) will be prevented, and that is all; but the water which would have been drawn from the river, or the rainfall which would have been caught, to make good the loss, will simply be allowed to flow into the sea. If that water could be utilized there might be some advantage in doing away with these tanks, though this is far from certain. But it cannot be utilized until much further extension of the works shall have been undertaken. At great expense a certain extent of enclosed fields lying under the village tanks would receive water direct from the storage reservoir; but, if filled up, the tanks already fully provide for the irrigation of the same lands at *no* expense. This would be the only practical result of simply ceasing to employ the village tanks in the north-east monsoon.

124. Regarding the second reason for doing away with the tanks, according to the arrangements now proposed (para. 85) their beds may be cultivated in the *south-west* monsoon, should water be available, without incurring any further outlay, while still utilizing them for storing water in the *north-east* monsoon. In order to retain water in the storage reservoirs for cultivating the beds of the tanks in the north-east monsoon, however, much extra capacity will be wanted, and a further large increase in the size and cost of the works will be indispensable. Both the Giant's tank and the upper reservoir would need enlarging, and the discharging power of the Alavakka must be increased. Water must be held up for irrigating both the beds of the tanks, and the fields for which they now provide, a total of 10,800 acres.* Seeing that the inhabitants have now fully 11,000 acres to be brought under cultivation, such a work would, it seems to me, be, at the best, premature. It is not as though outsiders could purchase and cultivate the beds of the tanks; this latter right belongs solely to the present proprietors. Article 1 of a Proclamation dated August 24, 1875, runs:—"The tank is the property of Government; but so long as the tract of fields attached to it is occupied, it shall, for agricultural purposes, be considered to be the joint property of the proprietors of the fields in proportion to the shares held by them."

The restoration of the Giant's tank is, as I understand it, mainly to be looked at as a commercial undertaking to be carried out by Government, and the project to be supported seems to be, not so much the scheme which will most closely coincide with the wishes of the cultivators, or that is advisable merely in first appearance, as the scheme that while capable of fulfilling its objects (and therefore benefiting and adequately

* While increase of revenue would accrue from only 6,200 acres.

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remunerating the inhabitants and landowners) will also ensure the best possible return to Government. Taking this view of it, a reference to prospects of revenue (para. 170) leaves little doubt as to the project to be recommended. So long as the proprietors have other uncultivated irrigable land, and so long as enough water can be obtained from the Aruvi-áru—(and perhaps, also, so long as there is an ample extent of available Crown land which can more cheaply be rendered irrigable)—the second proposal appears to be the preferable one.

126. *Distributing Channels.*—Whatever system be adopted, much difficulty will be experienced for the first few years in satisfactorily arranging for the supply of water to the lower fields—those lying towards the coast—but it will probably be found that by continuing to make use of the village tanks as above suggested, a saving may be effected in the cost of opening channels of distribution. This is a detail which it will be possible to investigate only after an enlarged map of the irrigable land has been prepared. Should the scheme for the restoration of the Giant's tank be carried out, the officer placed in charge of the construction might perhaps be able to fix the most suitable lines for these distributing channels. It will apparently be necessary to open them along each of the boundaries of the minor drainage areas or shallow valleys into which the plain is sub-divided, but in some cases the water might pass down from tank to tank. Any work of this nature will be of a simple and comparatively inexpensive character, the excavation being in loamy soil throughout the district, and the regular fall of the ground being of material assistance.

Section II.—Estimated Cost.

127. The estimate is divisible into five items :—

1. The construction of the catch-water reservoir, with its connected works, including deviation of roads, &c.
2. The formation of the supply canal, or Alavakka.
3. The restoration of the Giant's tank.
4. The formation of distributing channels.
5. Non-effective clarges : *i. e.*, the expenditure on concurrent details, and not on the actual works of construction.

128. *Assumptions : Item No.* 1.—It is assumed that the puddle trench will average 20 feet deep in the bed of the valley, and 12 feet deep at the sides, where rock is nearer the surface, and that blasting will be unnecessary in it, but that all material which can be removed with crowbars and picks will be taken out. Any leakage through the lower rock will be quite trifling, and it has been allowed for in the calculations, which are based on the leakage at a tank with an unpuddled embankment. The excavated material is to be utilized on the outer slope of the embankment, if not sufficiently good for the inner work, but stone procured will be deposited on the top of the inner slope. The value of this material, which will be paid for as earth-filling, is deducted from the cost of excavation. It is assumed that unsaleable timber found in the bed of the reservoir may be employed in the trench without payment of royalty.

129. It is presumed that no *special* difficulty will be encountered in the earth-work, and that water will be obtainable by means of pits sunk before the wet seasons at convenient distances near the line of the embankment. Much of the earth will need considerable transport, which could not be economically effected by coolies, and for this the employment of a few miles of the Decauville or some other light tramway, worked by small Indian ponies, is suggested.

130. In the waste-weir, or flood-escape, the rate allowed for concrete (as in all other concrete work in the estimate) includes the cost of transporting the cement to the site. The concrete will be of two qualities : the exposed or face-work in this or any other part of the works being of first class concrete, in the proportion of one of cement to two of sand, mixed with sufficient broken stone ; and the inner work being of second class concrete in the proportion of one of cement to three of sand. The price of cement is taken to be Rs. 9 per cask, delivered in Colombo. The course of stone-on-edge will be of the best quality laid in cement, but not necessarily very finely dressed ; the quality refers more particularly to the dimensions of the stones, and the mode of bonding or healing joint.

131. In the sluice it is proposed to construct nearly all the superstructure of brick-work. The bricks employed in the old head-sluice are of good quality (having borne the effects of all floods without material damage), and there seems to be no reason why equally good ones should not be burnt for the new work. The transverse wall and culvert walls will be of either concrete or stone-work up to the level of the springing of the arches. All copings in this and other works will be of first class concrete.

132. The work needed for opening the channel from the bed of the reservoir to the sluice is not charged for, the excavated material being used in the embankment and paid for on that work.

133. *Item No.* 2.—Clearing is estimated 150 feet wide, but trees standing between the canal and the embankment on its low side will not be removed.

134. The earthwork throughout is taken to be in easy soil. The material obtained by excavating the gauge-basin will go into the embankment of the reservoir, and the work is not separately charged for in this item.

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135. The best sites for the flood-escapes must be determined after the jungle has been cleared; it was impossible to fix them in the thick jungle when making the survey. The positions marked on the plans are therefore only approximate, and are merely intended to show that escapes should be formed at the nearest suitable sites. A sufficient allowance has been made for the very small amount of extra earthwork which this may possibly entail.

136. *Item No.* 3.—In the earthwork the same assumptions are made as in *Item No.* 1: that water may be procured by sinking pits near the embankment previous to the rains, that no *special* difficulty will be met with in carrying on the work, and that unsaleable timber may be used, if required, free of royalty.

137. The puddle-trench is supposed to run 10 feet deep. This will usually carry it into the original ground, which is all clay, and in any case the old embankment is of such good material (clay), and so very broad, that a less depth would probably be quite enough. No charge is made for excavating the trench, the soil from which will be used in the bund, and will thus be paid for as 'earth-filling.' The puddle is rated somewhat lower than usual, the clay being obtainable close to the site, and at no more expense than that of procuring ordinary soil.

138. The charge for re-laying the old pitching is a somewhat doubtful one on account of the uncertainty regarding the quantity, as pointed out in para. 113.

139. No rock has been seen within several miles of the proposed flood-escape, and the estimate for that work is made on the assumption that some of the old pitching will be used for the concrete.

140. *Item No.* 4.—I have followed Major Woodward in assigning a sum of Rs. 50,000 for opening the necessary main distributing channels from the sluices, but I have no data which enable me to state that this amount will prove sufficient. This should be made the subject of a separate estimate after the irrigable land has been surveyed and the routes of the channels have been settled.

141. *Item No.* 5—This requires no explanation, but it may be stated that it is assumed that houses for 2,000 labourers will be required, together with a hospital, doctor's quarters, elephant-sheds, stores, workshops, and superintending officers' bungalows.

142. 'Transport' includes transporting to the site all tools and materials other than lime, cement used in concrete, and the tramway (if it should be laid down). The cost of bringing these to the site must of course be entered against the details on which they will be employed, or otherwise a fictitious saving would appear to be effected by their use.

143. Clerks' pay is to be charged proportionately against 'contingencies.' It may be necessary to send to India for labour; if so, the cost of this also should be entered against 'contingencies.' It is assumed that the whole work will occupy four or five years, and provision for the maintenance of the completed sections of the various items is included, until all is finished.

144. *Estimate.*—These preliminary assumptions being understood, the estimated cost of the various works, including 'contingencies,' is as follows:—

Item No. 1.—Construction of catchwater reservoir:—

Clearing site of works	...	Rs. 3,300
Formation of embankment	...	260,590
Construction of waste weir	...	104,597
Construction of sluice	...	30,338
Diversion of road	...	5,500
Total	...	Rs. 404,305

Item No. 2.—Formation of supply canal:—

Clearing site of works	...	Rs. 4,400
Formation of canal	...	75,460
Construction of gauge-basin	..	3,135
Construction of falls	.	5,280
Construction of flood escapes and silt-trap		17,468
Erection of road-bridge, with approaches		14,839
Total	...	Rs. 120,582

Item No. 3.—Restoration of Giant's tank:—

Clearing site of works	..	Rs. 3,520
Formation of embankment	...	328,724
Re-laying old pitching	...	77,000
Construction of sluices	...	35,618
Construction of flood-escape	...	8,316
Total	..	Rs. 453,178

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Item No. 4.—Formation of distributing channels ... Rs. 50,000

Item No. 5.—Non-effective charges :—

Erection of 'lines' and buildings, including clearing ...	Rs. 19,800
Transport of tools and materials	5,500
Maintenance of works	5,500
Total ...	Rs. 30,800

145. *Abstract Estimate.*—The abstract of the above is as follows :—

Item No. 1.	Construction of catch-water reservoir ...	Rs. 404,305
„ 2.	Formation of supply canal .	120,582
„ 3.	Restoration of Giant's tank ...	453,178
„ 4.	Formation of distributing channels ...	50,000
„ 5.	Non-effective charges	30,800
	Total ...	Rs. 1,058,865

Section III.—Prospects of Revenue.

146. The annual revenue to be derived from these works will be received from the two usual sources :—the water-rate, estimated at Rs. 1 per irrigable acre ; and the increased paddy-tithe, depending on the average price of paddy, which, when the scheme is in working order, may be estimated at 75 cents per bushel.

147. Schedule No. 2 shows that the present average crop from the fields inside the Giant's tank is 2,514 bushels, one-tenth of which, at Rs. 1·50, the average price for the last few years, is equal to Rs. 376.

148. Schedule No. 1 gives the present average crop from the fields under the tank as 23,575 bushels, one-tenth of which, at Rs. 1·50, is equal to Rs. 3,535.

149. The average crop throughout the irrigable district, when there is a full water-supply, is stated to be 30 bushels per acre. Some lands are said to give 100 bushels, and 50 and 60 bushels are not an uncommon yield. So far as my own observation goes, I should say that the crops are decidedly heavier than those in the Wanni-hatpattu, North-Western Province, where the average yield is reckoned to be 25 bushels per acre, and it seems likely that the estimate of 30 bushels in this district is not too high. The south-west monsoon will give the same amount over half the fields, making the total annual crop 45 bushels per acre over the whole cultivated area. When there is a good water-supply in the south-west monsoon—which may be once in two or three years—the beds of the village tanks (and távadiyúr tanks, also, if desired) may be cultivated according to the proposed arrangements, and doubtless many of them will be sown. Leaving the return from this out of consideration, however, (as counterbalancing occasional poor crops from causes independent of irrigation, and providing for the maintenance of the works the particulars of the flow of the Aruvi-áru show that in one year out of ten a partial, if not a complete want of water should be anticipated. Deducting on this account, therefore, a tenth from the annual crop, the mean yield may be estimated at 40 bushels, one-tenth of which, at 75 cents a bushel, will give a return to Government of Rs. 3 per acre cultivated.

150. The return may be divided into three statements :—

(1) The revenue derivable *immediately* on the completion of the works.
(2) The revenue derivable when all the land now claimed by the inhabitants of the district has been brought under cultivation.
(3) The revenue derivable when all the land for which water will be provided has been brought under cultivation.

151. The *immediate* revenue is an unquestionable one. The enclosed fields now cultivated under the Giant's tank have an area of (say) 4,600 acres, and there is no doubt as to their being all sown as soon as water is made available. The water-rate will be collected over the total area claimed, viz., 15,000 acres, and the return will be as follows :—

		Rs.	cts.
Tithe on 4,600 acres at Rs 3 per acre ...		13,800	0
Water-rate on 15,000 acres at Rs. 1 per acre ...		15,000	0
		28,800	0
DEDUCT :—			
Present tithe on lands inside the Giant's tank	376		
„ „ under the tank	3,535		
		3,911	0
Nett immediate return due to works ..		Rs. 24,889	0

or an interest of 2·35 per cent. on the total expenditure.

152. There cannot be any doubt that the whole of the lands claimed under the Giant's tank, including those to be exchanged for submerged lands, will be cultivated as soon as possible after the completion of the works, and probably most of the area will be sown

during the first year. Certainly three years will allow sufficient time for this to take place. The return will then be :—

Tithe on 15,000 acres at Rs. 3 per acre	...	Rs. 45,000
Water-rate on 15,000 acres at Rs. 1 per acre	...	15,000
		60,000
Deduct present tithe, as above	...	3,911
Nett return from lands claimed	...	Rs 56,089

or an interest of 5·30 per cent. on the total expenditure.

153. The date at which the additional 10,000 acres for which water will be provided will be brought under cultivation is more uncertain. Many of the present proprietors will purchase land, and other settlers will certainly come from Jaffna and India. (*Vide* Appendix, *Note* 6.) I have been informed, too, that Indian labourers engaged on the works would take land in part payment, or at any rate would purchase and settle down on small plots, if due encouragement were offered by Government. Most of these men are cultivators, and their highest aim is to obtain a piece of land sufficient to provide them and their families with food and clothing – their only wants. At present they return to India when they have saved enough money, and settle down there, a prey to the village usurer. I believe, however, that the easily-cultivated, rich land under the Giant's tank, only two days' journey from their own country, would offer a more tempting prospect. This opinion is shared by many of the men themselves, a practical proof of which is found in the fact that even with such an inferior water-supply as the present one, the overseer and men (all from India) who were working under me on this survey settled down in the district on the completion of my work. Two others whom I sent to Colombo also returned there. Of course these are merely isolated cases, but they tend to prove that the district possesses superior attractions for such men. My own opinion is that the whole of the 10,000 acres will be under cultivation within ten years from the completion of the works. At any rate, that the land will soon be cultivated appears to me to be certain. The return will then be :—

Tithe on 25,000 acres at Rs. 3 per acre	...	Rs. 75,000
Water-rate on 25,000 acres at Rs. 1	...	25,000
		100,000
Deduct present tithe, as above	...	3,911
Nett prospective return	...	96,089

an interest of 9·10 per cent. on the total expenditure; or, deducting the amount to be realized by the sale of the additional land at the upset price (Rs. 10), an interest of 10 per cent.

154. Thus, the return to be looked for is:

Immediately, an interest of 2·35 per cent.;
In three years, an interest of 5·30 per cent.;
In (about) ten years, an interest of 10 per cent.

155. Instead, however, of paying a water-rate in perpetuity, the present proprietors would, I have been informed, be willing to commute it, as in some instances in the North-Western Province, by a payment, for ten years, of a double water-rate, or two rupees per acre. This, it seems to me, would be preferable both in the interest of Government and of the landowners. The latter would in a few years feel themselves freed from the incubus of a troublesome tax, and Government would largely profit by it. In this case the return from the lands now claimed would be

Prime cost of works	...	...	Rs 1,059,000
Received as commuted water-rate on 15,000 acres at Rs. 20		...	300,000
Nett cost	...	...	759,000
Tithe on 15,000 acres at Rs. 3	...	...	45,000
Deduct present tithe	...	...	3,911
Nett return due to works	..	...	41,089

an interest of 5·41 per cent. on the nett outlay.

156. When all the area to be now rendered irrigable has been cultivated, the return, supposing the whole water-rate to be commuted, would be:

Prime cost of work	..	...	... Rs 1,059,000
Deduct value of land sold, 10,000 acres at Rs. 10,		Rs. 100,000	
Commuted water-rate	...	500,000	
			600,000
Nett cost of works	...	...	459,000
Tithe on 25,000 acres at Rs. 3	...	...	75,000
Deduct present tithe	..	..	3,911
			Rs. 71,089

an interest of 15·5 per cent. on the nett outlay.

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157. This arrangement is to be strongly recommended. The interest obtained by Government would be largely increased, and the profits would thus be more equally divided, (without reducing those of the cultivators); the landowners would commute their water-rate on very favourable terms, which they could well afford; and there would be a sum of Rs. 600,000 available for further extensions of this work, or for other works. Every future enlargement of the works, until all the ordinary-minimum flow of the river has been utilized, will increase the return, and if provision were made for supplying an additional 6,000 acres with water (*cf.* para. 116) at a cost of about Rs. 100,000, the interest would become about 24 per cent. When the works are fully developed it may be expected to be almost 30 per cent on the nett amount invested.

158. It is believed that these probable returns are not over-estimated. They depend, however, on two assumptions:—

(1) That the present landowners will be able to procure sufficient labour for cultivating, at an early date, the area now claimed.

(2) That the additional area for which water is to be provided will find a sale.

159. (*a*) With respect to the former, the population in the villages under or in the Giant's tank is stated in the schedules to have been, in 1876, 4,539.* At the actual rate of increase of the district, as found by the late Census, it will be, on the completion of the works, 4,660. It is commonly reckoned in the district that one man ordinarily cultivates three acres of land under rice, and as one-fourth of the population may be taken to be available for the work, it appears that without hired assistance only 3,555 acres can be regularly cultivated in each season. The question of a labour supply is therefore an important one.

(*b*) According to the usual arrangement, labourers who are engaged as cultivators are merely fed and clothed until the crop has been gathered. They are then paid for their services in either money or kind, rarely the former. This system permits men with only a few spare bushels of rice (or often with only sufficient credit to enable them to borrow the rice at exorbitant rates of interest) to employ the labour necessary for cultivating all the land they possess. The only desideratum, then, is the *presence* of the labour; if it is present, there is no practical difficulty in hiring it.

(*c*) Throughout the district every one, whether landowner or cultivator, assured me that labour always is and will be plentiful. The people state that they have not the slightest doubt on this point, and that all they require is the water. (*Cf.* Appendix, *Note* 6.) The payment of the water-rate on all irrigable lands claimed will certainly act as the strongest incentive to cultivate the whole area at as early a date as possible. It would probably be found that the work of restoration would induce a steady flow of labour to the district from the adjoining Indian coast, just as the prospect of finding work in the Kandyan hills attracts a regular stream. In the Mannár District the labour would, however, be more permanent (and undoubtedly the climate and general conditions would prove more attractive) than in the coffee estates; and as the landowners would begin to derive benefit from the works at the end of the first year after their commencement (by the diversion of local rainfall down the Alavakka) ample time would be given for such a flow to set in, and for the preliminary operations of clearing and preparing the land for cultivation to be, at least, well-advanced. In order to encourage this to the utmost, it may be suggested that no water-rate should be levied until the full completion of the works, even though part of the land would previously be supplied with water by means of them. Under these conditions it appears to me that there needs be little apprehension as to the almost immediate cultivation of all the land now claimed.

160. The second assumption—that the additional 10,000 acres will soon be sold—cannot be supported by much evidence, and the slow rate at which land has been taken up under many other smaller reservoirs might seem to warrant an adverse opinion. But the circumstances are very different at the Giant's tank, and if this argument is held to have any force, an opposite conclusion may similarly be drawn from the experience in the case of the works in the Eastern Province. To rightly estimate the probability of a sale of the land it is necessary to state the conditions which will prevail at the Giant's tank (when restored), as compared with the conditions which have led to the small sale effected in many other instances.

161. (1) In the first place, the inhabitants are altogether Tamil (with the exception of a very few Moormen), and no one will deny that Tamils are infinitely more energetic and enterprising than the Kandyan Sinhalese of the other tank districts. The Kandyan Sinhalese villagers are, so far as my knowledge of them goes, essentially a cautious, stay-at-home, conservative race, who will die of starvation rather than leave their ancestral eighth of an acre, with its equivalent share in their muddy tank. I have known several of these men attend a sale of land which they wished to purchase (taking money for the express purpose), and come away without making a bid, having, at the last moment, decided to "wait and see." That was four years ago, and the land is still unpurchased under Uswewa. They are still "waiting to see."

(2) There is the presence of an over-abundant agricultural population only two or three days' journey distant, both in Jaffna and on the Indian coast. These men are even

* This appears to be considerably under-estimated.

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now beginning to be attracted to the district, as stated by Mr. De Hoedt (*vide* Appendix, *note* 6), and the attraction cannot but be greatly increased by a plentiful water-supply.

(3) The district is comparatively healthy; compared with other tank districts, it may be termed a sanitarium.

(4) No heavy clearing is needed in order to bring the land under cultivation. Forest is not found on it, and much of the land is quite clear. This will reduce the cost of opening the land by Rs. 20 or Rs. 30, or even more, per acre.

(5) Various qualities of soil are to be met with, and that in the higher land is of great depth and extremely fertile, some of it probably being unsurpassed in the Island in this respect.

(6) No expensive levelling of the surface will be wanted; the ground has already a regular and sufficient fall for irrigation.

(7) There is less likelihood of a failure of the labour-supply than in other districts, Jaffna perhaps excepted.

(8) Several "new products," as well as the older ones, appear to be fitted for cultivation in the irrigable land.

(9) There is immediate proximity to a place—(it can hardly be termed a "port")—from which produce may be shipped to Colombo or Southern India.

Seeing that these advantages are not to be found in combination with a good water-supply in any other part of Ceylon, it appears to be only reasonable to anticipate that the land will find a readier sale than in other irrigated districts, Batticaloa not excluded.

162. With respect to "New Products" some further information may be given:—

(1) There is no doubt as to the growth or permanence of the mulberry. Trees said to be 30 years old are now to be seen in Mannár, altogether uncared for but still healthy in appearance, in a spot where even grass must find the struggle for existence a real one during the dry season. This shrub is greatly improved by irrigation, and might doubtless be successfully cultivated in the land near the coast which is ill-adapted for plants requiring a richer soil. For the silk-winding, labour will be obtainable from the adjoining coast, where there is, I am informed, a caste who make it their special occupation.

(2) Tobacco is already one of the staple productions of the district, and is proved to flourish in all parts of it, although its systematic culture has as yet been undertaken chiefly near Iluppeikadavei. It is said that the finest tobacco hitherto produced in the district was grown not far from Arippu, in the land under the Akati-Murippu tank, but the plants in the small patches of garden immediately under the Giant's tank looked as vigorous and healthy as could be wished for. The soil is probably too heavy to produce the more delicate varieties, but the stronger full-flavoured kinds may be reared without difficulty. Under present circumstances only one crop can be obtained from the plants, but were water rendered available for their cultivation in the south-west monsoon, an additional crop could be gathered from the same roots.

(3) Indigo is already to be met with in a wild state throughout the jungle, in suitable spots, and with a sufficient water supply there appears to be no reason whatever for its not being made a remunerative cultivation.

(4) Cocoanuts are not yet grown in the irrigable lands. An attempt was made to introduce them near the coast, but the site being an unfavourable one (over rock, it is said) the result was a failure. Most of the low-lying sandy soil is, so far as can be judged, admirably adapted for the growth of the tree, and as the roots would be able to obtain moisture in any season, however dry, the droughts which sometimes cause serious loss in other parts of the Island would practically have no injurious effect on it. Plantations raised in Mannár Island have been found a financial success, and the adjoining coast ought certainly to be at least as favourable a site.

(5) As plantains flourish when sheltered from the strong south-west winds, it would probably be found that the valuable Manila hemp might also be successfully introduced after the restoration of the works had ensured the possibility of irrigating it in the dry season. It is said to require a somewhat heavy, deep soil.

(6) Jute also appears to be adapted for culture in this district If, as I believe is the case, the delta of the Ganges is the most suitable ground for it in India, the loamy deposit which forms the Mannár plain ought to be well fitted for it.

(7) India-rubber would also be worth a trial, and the low prime cost of the land, and the small expense to be incurred in rendering it ready for cultivation would materially improve the prospects of its remunerative culture. If it can be grown at a profit in districts where a primary outlay of at least Rs. 100 per acre is necessary, it would be doubly profitable under the Giant's tank.

(8) The various root crops which form one of the regular cultivations of the Jaffna peninsula have not yet been tried in the irrigable land, but there is good reason to believe that the culture of many of them would yield satisfactory returns.

(9) Among other products which would be likely to give good profits when irrigated and scientifically grown, may be included cotton, vines, and oranges, all now growing in the district. For the two latter there should be a good market in South India and Colombo, to which fruit could be sent in a few days. I was informed in Malta that oranges would keep perfectly sound for three weeks in the hottest climate, and the head-gardener at the Governor's gardens there offered to forward some to Colombo with a

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guarantee that they would arrive in good condition. If these statements are correct, it is surprising that no attempt is made to supplant the vile productions now sold as "oranges" in the Island. For the profitable culture of cotton, irrigation and a rich soil are well known to be almost essential.

(10) Liberian coffee might also be worth a trial, seeing that a much smaller crop than is obtained in more expensive districts would yield equally good returns with those elsewhere procurable.

(11) With the super-abundance of grass and straw which would be one of the results of full irrigation, it may be anticipated that cattle-breeding would, in conjunction with high cultivation, become a paying industry. During the damp season the whole ground is covered with a thick growth of succulent grass on which the cattle feed with avidity, the jungle being sufficiently open to permit it; but in the dry season this dies down and disappears. The regular paddy crops would furnish the animals with a plentiful supply of food at these times, at very slight cost, which would be recouped by the manure obtainable, and *kollu*, as a green-crop, might advantageously be alternated with tobacco and other exhausting products.

163. In fact, hitherto the district has been untried and unappreciated. Should the repair of these irrigation works be carried out, there seems to be every prospect of its becoming one of the most productive in the Island. But the first desideratum is the means of regular irrigation. Under existing circumstances what is deemed to be a fair crop is gathered about once in two years, and during the other three seasons in which cultivation ought to be in progress the cultivators are living on the proceeds of it, almost unemployed, except that a partial sowing is sometimes undertaken during the other north-east monsoon. Meanwhile, the droughts carry off the cattle, and when the tanks are again full the people find themselves no better off than before the last good crop. (*Vide* Appendix, *Note* 8.) It is said that during 1880–1881 half the buffaloes in the neighbourhood of Parappan-kandal have died, and the mortality is attributed primarily to the want of water and suitable food. Agriculture is now in such a depressed state that cleared land of fully an average quality in fields lying under fairly good tanks may be purchased in various parts of the plain at little more (and sometimes less) than the upset price of Crown jungle. Tobacco culture is spreading in the north, but paddy growing is at least at a standstill. The practical outcome is that the Census shows the population of the district—instead of increasing at the average rate of the rest of the Island (nearly 15 per cent.) or at the much higher rate of some of the tracts provided, in recent times, with a regular water-supply—to be nearly stationary, increasing at about 2·7 per cent. in ten years. Some of the smallness of this rate of increase is doubtless due to the outbreak of cholera which occurred some years since, but in the case of a district so well situated the rate ought certainly to be higher than the average rate of the Island.

164. It is lamentable to think that while such has been the experience of the cultivators, an abundant supply of water—the certain and only remedy for these evils—which is obtainable at a fair outlay, has been flowing uselessly through the heart of the district into the sea. There is neither probability nor possibility of any material improvement unless this water be diverted over the adjoining lands. The cost of the necessary works will unavoidably be heavy, but the advantages to the cultivators will be proportionately great, and in a smaller ratio Government will also be benefited—directly, through the increased revenue to be received, and indirectly through the general prosperity and improved social and sanitary condition of the residents. (*Vide* Appendix, *Note* 7.)

165. The Government Agent has asked if the retention of so extensive a sheet of water and the periodical flooding of so large an area of additional fields might not injuriously affect the general health of the residents in the district. (Irrigation Committee's Report, 1867.) This seems to be a matter regarding which an irrigation officer's ideas will go for little, but it may be mentioned that after considerable experience of malarious parts of the Island it does not appear to me to be evident that insanitary effects are really attributable to irrigation itself. Observation shows that everything depends on the surroundings. Where much vegetable matter is undergoing decomposition malarial fever is very prevalent, whether irrigation is proceeding or not. Places, especially those near heavy forest, that were previously looked upon as moderately healthy for two or three comparatively dry seasons, have been rendered almost uninhabitable by a more than ordinarily wet one. In the Mannár plain there is no forest, and the jungle is usually very open; there is, therefore, little vegetable decomposition. Living under one of the larger sheets of water, and encircled by cultivated fields through the last north-east monsoon—a particularly wet one—my experience of the plain is that it may be very favourably compared with the feverish jungle of the North-Central or North-Western Provinces. My conclusion is that the clearing away of the large expanse of jungle (nearly 20,000 acres) to be brought under cultivation would have a most beneficial effect in greatly improving the sanitary state of the neighbourhood, and that although there would doubtless still be some malarial fever during the north-east monsoon (chiefly owing to the background of thick forest which hems in the plain on the inland side) it would be of a milder type than at present. During the south-west monsoon the strong sea-breeze carries the malaria inland (for the benefit of the residents on the opposite coast), and seemingly the district is and will be fairly healthy. The conclusion is based on the theory that malarial poisoning is caused by

germs generated and liberated by vegetable decomposition under special conditions, these germs being carried up and disseminated through the atmosphere during the day, and descending and being more thickly accumulated under the subsequent condensation at night.

166. *The village tanks.*—The financial results of abolishing the village tanks remain to be considered. In order to provide for the cultivation of their fields in the north-east monsoon, there must be impounded in the storage reservoirs (by para. 83)—

$$\frac{335,600,000 \times (4,600 - 880)}{4,600} = \text{about } 271,400,000 \text{ cubic feet}$$

without allowance for loss in the reservoirs. This quantity would be held by the Giant's tank if the water-level were raised one foot, at a cost of about Rs. 50,000. On this expenditure no interest would be derived.

167. To provide for cultivating the beds of the village tanks in the north-east monsoon, additional water for 6,200 acres must be impounded. The saturation of the ground has already been allowed for, and the extra water needed would be—

6,200 × 83,000 ...	514,600,000
Deduct rainfall 6,200 × 6,000 ...	37,200,000
Cubic feet	477,400,000

This and the former amount would raise the water level of the Giant's tank two feet nine inches, enclosing about 650 acres of additional ground. Over this area there would be loss as follows :—

650 × 71,500 (para. 66) ...	46,475,000
Deduct rainfall 650 × 6,000 ...	3,900,000
Cubic feet	42,575,000

Thus in all about 520,000,000 cubic feet must be caught and stored. For this purpose it would be necessary to slightly increase the capacity of the upper or catchwater reservoir by a foot in depth, so that it would hold about 115 millions of cubic feet extra, and to raise the water-level of the Giant's tank eighteen inches, giving it an extra capacity of about 410 millions of cubic feet. The cost of these works may be roughly estimated at Rs. 100,000.

168. The cost of abolishing the village tanks and providing for the irrigation of their fields and beds in the north-east monsoon alone would thus be :—

	Rs.
Cost of abolishing village tanks ...	50,000
Cost of irrigating their beds ...	100,000
Total ... Rs.	150,000

169. For the south-west monsoon the water wanted would be $\frac{6,200}{4} \times 141,000 =$ 218,550,000 cubic feet (by para. 85). This would necessitate further work, both to secure and to store the water, and the expense cannot be put down at less than Rs. 50,000. The total cost of the works would then become Rs. 200,000 at a very low estimate.

170. On this there would be the following return :—

	Rs.
Tithe on 6,200 acres at Rs. 3	18,600
Water-rate on 6,200 acres, at Rs. 1	6,200
	24,800
Deduct one-sixth for crops already provided for (para 149)...	4,133
Nett return ... Rs.	20,667

an interest of 10 per cent. on the estimated expenditure. This would leave the rate (from the whole outlay to be incurred) unaffected, whereas it has been stated (para. 116) that the irrigation of an almost equal extent of Crown jungle may be provided for at about half the cost; or, deducting the amount to be received from the sale of the land, at one-fifth of the cost, with the result of largely increasing the rate of interest. In the one case 6,200 acres would be irrigated, at a cost of about Rs 32·26 per acre, the irrigation of the same land being already provided for (say) once in three years; in the other case nearly 6,000 acres would be irrigated, at a cost of about Rs. 16·7 per acre, or, deducting the amount to be realized by sale of the land, at a nett cost of Rs. 6·7 per acre.

171. *Completion of original design.*—In previous reports on the Giant's tank it has been proposed to merely complete the original design, and it was my intention to describe the necessary works and to furnish a detailed estimate of their cost; but after fully

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considering the matter it has been found that such a design would fail to comply with most of the requirements noted in para. 49:—

(1) The water-supply obtainable would not be sufficient in dry years for meeting the wants of the cultivators in both monsoons.
(2) No extension of cultivation would be provided for.
(3) The works would admit of enlargement only at disproportionate cost.
(5) The prospect of a fair interest on the total outlay would be a somewhat questionable one.

With regard to the fourth principle, water could be diverted to the Akati-murippu tank, but at considerably greater cost than that necessary if the scheme now proposed be adopted.

172. By rendering the canal capable of conveying 800 cubic feet per second a water-supply enough for the north-east monsoon crop over the lands now claimed might be secured in ordinarily dry years, but no provision would be made for irrigating the lands in the south-west monsoon. The cost of the necessary works would, in this case, be approximately as follows:—

		Rs.
Restoration of Giant's tank	...	300,000
Repair and enlargement of canal	.	150,000
Reconstruction of head-work	...	70,000
Distributing channels ...	..	50,000
Non-effective charges ...	...	20,000
	Rs.	590,000

The return on this outlay would then be:

Tithe on 15,000 acres (one crop) at Rs 2·00 ...		30,000
Water-rate 15,000 „ „ 0·66 ...		9,900
		39,900
Deduct present tithe ...	...	3,911
Nett return	... Rs.	35,989

an interest of 6·1 per cent., with no possibility of increase.

173. To irrigate more lands (in the north-east monsoon only; they could not be irrigated in the south-west monsoon in any but specially good years), it would be necessary to greatly enlarge the supply canal, and to increase the head of water in the Giant's tank. Every such enlargement would reduce the rate of interest, instead of augmenting it, as will be the case if the project now suggested be adopted. It has been shown (para. 156) that if the water-rate be commuted over all the lands to be provided with water according to the new scheme, the nett cost will be about Rs. 130,000 less than that of this other proposal, while the annual return to Government will be just double. The scheme for completing the original design appears to have been recommended, partly through incomplete information as to the acreage of land claimed under the Giant's tank (formerly thought to be about 4,600 acres—that is, merely the present enclosed lands), and partly through the total absence of all accurate information respecting the flow of the Aruvi-áru. A project that at the best would be only partially effective—that could not furnish water for any additional lands which it might be wished to bring under cultivation—and that would be (relatively) more than twice as expensive as the suggested scheme—could not, as it appears to me, fail to be thought a most unsatisfactory one.

HENRY PARKER,
Irrigation Officer.

Colombo, 24th November, 1881.

APPENDIX.

Note 1.

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IN illustration of the exactitude with which the ancient Siṇhalese worked, the following table shows the present average height of the bed of the Alavakka, and the height that would be found at the same points if it had a regular inclination at the given gradients.

Distance in feet.	Required level of bed at gradient = 1 in 5,000.	Present level of bed of Alavakka.	
0	129·00	Supposed level of head-sluice.	
5,000	—	Sittāru.	
7,500	127·50	135·50	Excavation supposed to be unfinished.
10,000	127 00	130 00	
12,500	126·50	128·00	
15,000	126·00	126·00	
17,500	125·50	129·50	Excavation unfinished.
20,000	125 00	124·00	
22,500	124 50	125 00	
25,000	124·00	123 00	
27,500	123·50	123·00	
30,000	123·00	123·00	
32,500	122 50	121·50	
35,000	122·00	120·00	
37,500	121·50	121·50	
40,000	121·00	121·00	
	Gradient = 1 in 2,500.		
40,000	121·00	121 00	
42,500	120·00	120·00	
45,000	119·00	120·00	
47,500	118,00	118·00	
50,000	117 00	116 50	
52,500	116·00	115·50	
55,000	115·00	115 00	
57,500	114·00	114 00	
60,000	113·00	113·00	
	and so on.		

By way of comparison with this, it may be noted that Captain Schneider, R.E., in his report on the Giant's tank, prepared in 1807, stated a cutting of forty feet to be necessary before water will flow to the tank down the Alavakka; and that there was an error of twenty-four feet in his levels over the embankment of the tank. Mr. Twynam detected the latter 'with the naked eye.'—*Irrigation Committee's Report*, 1867, p. 234.

Note 2.

IT is to be observed that, apart from the fact that the special observations are defective in quantity and (probably) quality, the assumption that the mean ratio remains constant throughout the year is quite unsupported by any evidence.

The amount of annual evaporation adopted for the Giant's tank is very much less than that at Madras, but the circumstances are different. On comparing the rates for littoral stations in Ceylon it is seen that the calculated evaporation at the two places on the east coast—Trincomalee and Batticaloa—which may be regarded as having a physical environment resembling that of Madras, considerably exceeds the rate at any other coast station.

A further slight check is obtained by the mean yearly computed evaporation for the eight coast stations at which observations have been recorded for ten years. This is as follows:—

	Inches.		Inches.
1871	91·99	1876	78·03
1872	80·38	1877	72·85
1873	70 81	1878	74·28
1874	69·42	1879	76·29
1875	79·20	1880	77 96

Mean, 77 12 inches.

As these are *insular* tropical coast-stations, pretty evenly distributed round the Island—thus, if treated as a whole, practically eliminating the effects of the monsoons—the above mean (77·12), when reduced to their *true* mean, must almost necessarily be slightly higher than mean tropical rainfall, which Dr. Haughton (*op. cit.*) has shown to be 60 inches. (Fifteen littoral stations in Ceylon, at which the fall has been recorded for periods varying between about eight and ten years, give 60 2 inches.) There cannot be much doubt that the computed means must be *reduced*; all are calculated by the same formula, and the figures already given, even if slightly erroneous, show that at two low-lying stations (one of them being on the coast) the amount thus obtained is much too great. Hence, it may be concluded that the mean rate of evaporation for the Ceylon coast lies above 60 and below 77 inches, and considerably under the larger quantity. From this the induction follows that the deduced rate for the Giant's tank, in the driest part of the Island (which tends to increase the evaporation) and near the west coast (which tends to diminish the evaporation) is, at least, not *widely* wrong.

[It is especially noteworthy that the above annual means vary nearly according to the observations of the sun's disc. As the rate of mean South Indian rainfall was some years since shown by Dr. Hunter to correspond in some measure to the sun-spot periods, this agreement might perhaps be anticipated. With a greater number of stations, the correspondence would probably be

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even more striking. If these calculated amounts really represent, or even approximately represent, the true ratio of evaporation, it seems likely that induced atmospheric electricity is a more potent factor in the matter than sun-heat. It would probably also vary as the cosine of the latitude, in the tropics.]

Note 3.

FOR the sake of comparison, the quantity of water per acre required for cultivation in the north-east monsoon is noted below. As regards the cultivation in the south-west monsoon, the conditions are abnormal, and the amount needed for that season is not entered. It should be noted that these are the *maximum* amounts.

Water required.	Cubic Feet.
Total amount of water required per acre irrigated ...	213,000
Amount required, including rainfall, but excluding preliminary saturation of ground	175,000
Amount required, excluding rainfall and preliminary saturation of ground	117,000
Water expended.	
Total amount actually expended in the fields	150,000
Amount expended, including rainfall, but excluding preliminary saturation of ground	128,000
Amount expended, excluding rainfall and preliminary saturation of ground	83,000

With the mean *maximum* monthly evaporation from January to April, inclusive, the actual water-duty per cubic foot per second will be an irrigation of 58·5 acres, and, with the *mean* loss, this will become 67·1 acres.

For waste in cultivation no allowance has been made. As the calculation has been based on the decennial maximum evaporation, and filtration is included, it is manifest that (if the data are correct) more water than the above amounts cannot possibly be expended in the *field;* it must necessarily flow off into the jungle. It may perhaps be held that waste in this manner is unavoidable, but my own experience is opposed to such a conclusion. Where such loss occurs the supervision must either be wanting in quality or quantity.

The above figures clearly indicate the gross waste of water that occurs where an actual expenditure of nearly 400,000 cubic feet per acre is permitted (except, perhaps, in extremely porous soil).

Note 4.

THE following attempted investigation into the relative utilization of water in parts of India and at the Giant's tank illustrates the uselessness of endeavouring to compare the water expenditure of various countries without possessing a full acquaintance with the whole circumstances under which irrigation takes place in them.

Jackson says: "In the Madras Presidency and in the North-West Provinces one cubic foot per second waters in ordinary seasons 100 acres of rice";* but he also adds: "The general allowance of water to rice in the Madras Presidency is one cubic foot per second of supply to 40 acres."† This is exclusive of rainfall.

Without lingering over an endeavour to reconcile the two quotations, which, perhaps, though expressed in general terms, refer to different parts of Madras, it may be noted that at first sight —the usual datum in such comparisons—it would appear that there is a *much more economical* expenditure of water in North-West India than at the Giant's tank (as computed above).

But the annual evaporation for North-West India being 42 inches (Captain Cunningham's Roorkee experiments supporting those at Bombay), and at the Giant's tank 70 inches, and an annual filtration of 36 inches being assumed to be "common to both" (making the total loss 78 inches and 106 inches, respectively), the acreage irrigated in the former by one cubic foot per second is equivalent at the latter to $\frac{100 \times 78}{106} = 73{\cdot}6$ acres. In other words, the expenditure of water in North-West India is practically nearly *the same* as at the Giant's tank.

But there may be a considerable variation in the rate of filtration in the two cases, and there certainly is a wide difference in the amount of rainfall. The averages of the latter for Madras and N.W. India in the south-west monsoon, and at the Giant's tank (= Mannár) in the north-east monsoon (the times of the more extensive cultivation varying in India and Ceylon), are:

Madras, mean of 9 low stations	...	68 in.	... May to September.‡
N.W. India „ 8 „	...	32 in.	... June to September.‡
Mannár ...	...	25 in.	... October to March.

On examining into the detailed rainfall and evaporation it is seen that in Madras the average fall for the nine stations during each of the first four out of the five months under consideration either exceeds or is equal to the total monthly loss by evaporation and (assumed) filtration, and even in the latter month is 50 per cent of the loss. At the N. W. Indian stations, also, the mean rainfall in three months out of the four exceeds the combined loss, and in the other month is 90 per cent. of it From this it would naturally be supposed that in both districts the rainfall alone should prove almost, if not *quite* sufficient for all demands likely to be made on it on account of

* Hydraulic Manual and Statistics, p. 204. † p. [128.]

‡ Jackson, *op. cit.*—I possess statistics of no other low stations with a distinct S.W. monsoon rainfall. Where the rain is more evenly distributed the time of the chief cultivation is uncertain.

this one crop. Hence the conclusion is arrived at that there is a *very much more extravagant* expenditure of water in N. W India and Madras than at the Giant's tank.

The three results refer only to the period in which the main cultivation is carried on, but if the amount of water used for the smaller crop were included, the discrepancy, though less striking, would be practically unaffected. Without fuller data it is impossible to say which of the three is correct.

Note 5.

THIS would also permit the true discharging power of the weir to be accurately ascertained before its completion There is considerable uncertainty regarding the velocity of approach to large weirs, and it is very doubtful what would really be the rate in the case of this one With no allowance for velocity of approach the head would be only 5 ft 9 in., so that in any case the embankment would be safe.

Note 6.

THE following information respecting the labour supply has been furnished to me by Mr. De Hoedt, of Mannár, who is one of the largest proprietors of land under the Giant's tank:—

"I have just consulted the Adikars and other influential cultivators of Mántai, &c., and they agree with me that whatever extent of land may be irrigable under the Giant's tank, if restored, whether 15,000 or even 20,000 acres, will be at the very first year cultivated Even now there are lots of Jaffna and Indian labourers hired, and should water be a certainty no doubt more labour will be at once obtainable, and labour can be obtained to any extent when required. Besides this, we are agreed that numerous villages will spring up within a very short time, and be colonised by Jaffna and Indian labourers The Mannár maritime district is not a '*terra incog*' to them, and I can now point you to an undeniable fact,—that almost all the lands now applied for for purchase in the district are by Jaffna people.

"There is another fact to which I would draw your attention The old site of the 'Tirukeswaram'* temple has been applied for for purchase, and already surveyed, and the intending purchaser is resolved to restore the celebrated temple once more. This will attract a large body of people to Mántai District, whilst the restored tank and the large supply of water will be an inducement to the cultivating class to settle in the country."

Note 7.

IN connection with this it may pertinently be enquired whether the profits from irrigation works in Ceylon should not be divided somewhat more equally than at present. It seems unfair that while the proprietors or cultivators of irrigated lands receive an increased return amounting to, commonly 50, and sometimes 100 or more per cent on their former return, Government should, on the average, derive barely any interest from the money sunk in irrigation works. The restoration of the Giant's tank will afford a striking example of this inequality of gain Instead of one precarious crop in each two years, as at present, the cultivators will obtain two full north-east monsoon crops, and two half crops in the south-west monsoons,—altogether three full crops in place of one. The pecuniary advantages which they will thus reap will be equivalent to an increase of about 150 per cent. on their present profits, not reckoning anything for increase of *yield*, which, as the Irrigation Commission pointed out in 1867, should really be taken into consideration. In no other country in which irrigation is carried on is a similar state of affairs to be found. Adding together the paddy tithe and the ordinary water-rate the charge in Ceylon averages from Rs. 4 to 5 per acre; while in India, with a people far less able to pay a heavy tax, the lowest consolidated charge (water-rate and land-tax) is about Rs. 6 per acre. In Europe, I believe, the water-rate per irrigated acre alone amounts to this. When the average interest obtained in India on all irrigation works completed up to 1879 (excluding two very unprofitable schemes carried out by private companies) was only 5 per cent.† (with a charge per acre at least 20 per cent. higher than in Ceylon), while the price of labour and cost of construction were in many instances not more than one-third of our corresponding rates, and always very much lower than those rates, how can irrigation in Ceylon, under existing restrictions, be made to yield a satisfactory average return? It can only be possible by leaving unrestored many works that might otherwise be repaired at a profit. If the construction or repair of the larger irrigation works in Ceylon is, in the majority of cases, strictly a commercial undertaking, the handing over almost all the profit to the cultivators (who share none of the original risk) is merely unappreciated and unnecessary generosity. The few are benefited at the expense of the many; through such an unequal division of profits they receive the money that might, in the hands of Government, be utilised for furnishing the means of irrigation to thousands of less fortunate cultivators.

Note 8.

If any evidence is needed to bear out (and much more than bear out) my remarks on the want of water in the district, it will be found in the following extracts from the Administration Reports for the Province for the last few years:—

1873.—*Report on the Mannár District*, by Mr. A. Bailey.—"Crops were generally short, and the extent of land sown was less than usual. The 'Kálapókam,' *i.e.*, the first harvest of the year, which is by far the most extensive, suffered considerably from want of rain at the beginning of the year. Some of the late-sown fields were not reaped at all, the crops having been unable to withstand the effects of the drought

"The rains which accompanied the setting-in of the south-west monsoon were not sufficiently heavy to fill the tanks, and the 'Sirupókam,' or lesser harvest, was therefore exceedingly small. A few villages were cultivated, but to a very limited extent.

* This is the old Hindu temple at Mantota (or Mántai), one that is said to have once been almost the rival of Rámeswaram temple.—(H. P.)

† *Irrigation in India, and its Financial Results*, 1881.

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1874.—*Report by the Government Agent, Northern Province* (Mr. Twynam).—"The only matter for congratulation in regard to the increase in the revenue of the Mannár District is that the grain was imported in sufficient quantities to meet the failures of the local crops, and that the people found the means of purchasing it. The loss of the grain crops, however, and the disposal of household and other property in order to obtain the means of purchasing food must have reduced many of the people almost to beggary, the people of the mainland pattus of that district having very little to fall back on when their paddy crops fail"

.... "In the Mannár District, the drought which I referred to in my report for 1873 as prevailing in that district at the close of that year, continued, I may say, throughout the year.

"Little or no rain fell in any part of the district till towards the close of the year, and the state of the country and the condition of the people for want of water at the close of September was most deplorable.

"In all my experience of that district in previous years of drought I have never witnessed anything like the hardships the people were subjected to owing to the scarcity of water, for the most ordinary domestic purposes, in September and October. The wells in many villages had completely dried up, and failed to afford a drop of water, while in others and in pits sunk in the beds of tanks and streams the supply was so scanty that women and children had to remain round them for hours whilst water trickled in in sufficient quantities to be scooped up with cocoanut shells.

"However sceptical some people at a distance may have been of the prevalence of distress in any part of the Northern Province, and of the necessity for the adoption by Government of any extraordinary measures to meet it, I feel convinced, from what fell under my observation in circuits made by me in the Mannár and Mullaittívu Districts, that the condition of those districts from the early part of 1874 to the close of October was such as to give cause for serious anxiety, and it was, I believe, owing to the prompt action of Government in affording relief in the shape of work that the people, and more especially the poorer classes, were saved from starvation, sickness, and death.

"In the Mannár District, in which the supplies of grain in the villages had become very low, owing to the failure, more or less, of the crops for two or three years, and the almost total failure of the Kúlapókam of 1874, it became necessary not only to afford relief in the shape of work, but also to supply food."

1875.—*Reports not published.*

1876.—*Report by the Government Agent* (Mr. Twynam).—"The gloomy forebodings of 1875 were in a great measure realized during 1876, the year having been one of great trial to the people of the Northern Province owing to the deficiency of rain, the consequent failure to a large extent of the Kúlapókam paddy crops, and the outbreak, in a severe form, of cholera in all districts of the Province."

"Owing to the drought, and consequent want of sufficient food and water, hoof-and-mouth disease prevailed more or less throughout the year in all districts of the Province"

Report on the Mannár District, by Mr. Paterson.—"The continued drought towards the end of 1876 has caused much damage to the crops, and has consequently created scarcity of food."

1877.—*Report by the Government Agent* (Mr. Twynam).—"I have already remarked that though there was undoubtedly much distress consequent on the drought and the failure of the paddy crops, there never was at any time anything approaching to famine"

"The population of the maritime pattus of Mannár received aid in the shape of a loan from Government of 2,000 rupees, for which they were very thankful, and with which they purchased seed paddy in the Anurádhapura District"

Report on the Mannár District, by Mr. Massie.—"The inhabitants of the district also suffered from scarcity of food, the poorer classes being unable to buy wholesome rice until the latter part of the year. The District Road Committee provided work as long as its funds lasted. Government kindly allowed a sum of five thousand rupees to me, and a larger sum to the Public Works Department, for relief works, and with all these aids work was generally available for those willing to accept it, and many deaths (which must otherwise have occurred) from starvation were averted The people of the mainland were, I found, many of them eating "kidangupullu," (seeds of grass collected by the ants in their store-houses), most unwholesome and unsatisfying food."

1878.—*Report on the Mannár District*, by Mr. Fowler.—"Under land revenue there is a decrease of 9,347 rupees. The amounts realized under rents, licenses, stamps, salt, and some other heads show considerable increase, and I think that this shows that while the inhabitants of Mannár town—traders and people who are not dependent on agriculture—have advanced, the agricultural population has receded. I fear that this will continue to be the case until steps are taken to ensure a regular supply of water by irrigation works. At present the cultivators are entirely dependent on the rainfall, which is remarkable for its uncertainty in this district."

1879.—*Report by the Government Agent* (Mr. Twynam).—"The year 1879 cannot be said to have been altogether a favourable one for the Province in general, there having been a considerable failure of the Kúlapókam paddy crops of the Jaffna District, and an almost total failure of the crops of the Mannár District"

"On reports being received from the Assistant Agents of Mannár and Mullaittívu of the failure of the paddy crop and the scarcity of grain, relief works were sanctioned by Government in those districts, a sum of Rs. 10,000 having being allowed to be expended in them."

1880.—This was considered a very favourable year; that is, the people obtained one good crop in the north-east monsoon. In my report on the Akatimurippu tank I have already remarked on the effect of the subsequent drought on the cattle of the district. In October seed paddy was selling at Rs. 2·50 per bushel.—(H. P.)

1881.—This has also been thought a very good year, a good crop having been obtained in the north-east monsoon, though no sowing was possible in the succeeding season. The effect of the drought on the cattle has been similar to that of last year.—(H. P.)

ABSTRACT of SCHEDULE No. 1. (**List of all Tanks in the inhabited and uninhabited Villages capable of being fed by the Giant's Tank in the Mannár District.**)

	Tanks in the Inhabited Villages.		Tanks in the Uninhabited Villages.		Tanks inside the Giant's Tank.		TOTAL.	
	B.	A.	B.	A.	B.	A.	B.	A.
Extent of tanks	13,885	6,182	6,310	2,804½	2,240	995½	22,435	9,982
Total extent of fields below the tank ...	16,560	8,249	7,025½	3,122½	3,012	1,338½	28,597½	13,710
Area of existing fields	10,613	4,718	2,563½	1,139	1,401½	623	14,578	6,480
Average area sown in north-east monsoon ..	2,738½	1,218	365	162	330½	147	3,434	1,527
Average area sown in south-west monsoon ...	332½	148	37½	16½	13½	6	383½	170½
	B.	Q.	B	Q.	B.	Q.	B.	Q.
Average crop reaped in north-east monsoon ...	18,792	0	2,242	8	2,411	16	23,445	24
Average crop reaped in south-east monsoon ...	2,415	0	126	16	102	16	2,644	0
Number of inhabitants	4,172		—		367		4,539	

ABSTRACT of SCHEDULE No. 2. (**List of Tanks inside the Giant's Tank.**)

	Inhabited Villages.			Uninhabited Villages.	
	B.	A.		B.	A.
Extent of tanks	995	442	...	1,245	553
Total extent of fields below the tank ...	1,827	8,812	...	1,184½	526½
Area of existing fields	973	432½	...	428½	190½
Average area sown in north-east monsoon	341	116	...	69½	31
Average area sown in south-west monsoon	10	4½	...	3½	1½
	B.	Q.		B.	Q.
Average crop in north-east monsoon ...	1,805	16	...	606	16
Average crop in south-west monsoon ..	57	16	...	45	0
Number of inhabitants	367		...	—	

ABSTRACT of SCHEDULE No. 3. (List of Uncultivated Távadiyúr Villages in Nánaddán East and West and Mántai South and North.)

		No. of Tanks.		Extent in Bushels.
Nánaddán East	...	10	...	552
„ West	...	23	...	570
Mántai South	...	10	...	950
„ North	...	15	...	810

ESTIMATE of the EXPENSES necessary to be incurred for the restoration of the Giant's Tank, Northern Province.

PLAN OR DESCRIPTION.	PARTICULARS.	Quantity.	Rate.		Portion of Work to be performed by Contract or otherwise.	
			Rs.	cts	Rs.	cts.
Item No. 1—Construction of Catchwater Reservoir.						
This item provides for the construction of an upper reservoir near the Giant's tank in the Aruvi-áru valley, according to the description in the report on the Giant's tank, and as shown on the plans and drawings. It includes also the diversion of the Mannár-Madavachchiya road round the north side of the tank, and the re-erection of the bridge and culverts now existing in the present road.	Clearing site of works ...	50 acres	60	0	3,000	0
	Earth-filling in embankment ..	83,000 cubes	1	80	149,400	0
	Excavation in trenches ...	12,400 cubes	2	50	31,000	0
	Earth excavation at flood-escape ...	5,000 cubes	1	0	5,000	0
	Puddle ...	20,000 cubes	3	0	60,000	0
	1st class concrete ...	200 cubes	80	0	16,000	0
	2nd do.	1,110 cubes	60	0	66,600	0
	Stone-on-edge in cement	168 cubes	100	0	16,800	0
	Brickwork in sluice ...	212 cubes	40	0	8,480	0
	Rough pitching at flood-escape ..	70 squares	30	0	2,100	0
	Planking in sluice with hooks ..	900 sq ft	0	50	450	0
	Six iron gratings	60 cwt.	12	0	720	0
	Iron sluices, fixed ...	6	500	0	3,000	0
	Deviation of road ...	—	—		5,000	0
					367,550	0
	Contingencies, 10 per cent ..				36,755	0
			Total		404,305	0

(Continued over)

ESTIMATE—*continued.*

PLAN OR DESCRIPTION.	PARTICULARS.	Quantity.	Rate.		Portion of Work to be performed by Contract or otherwise.	
			Rs.	cts.	Rs.	cts.
Item No. 2—Formation of Supply Canal.						
This item provides for the formation of a supply canal from the upper reservoir to the Giant's tank, as shown on the plans and sections, and according to the description contained in the report on the Giant's tank It includes all masonry works along the line of the canal, amongst others the bridge over the Mannár road, a Kalingulah bridge at 17¾ miles from Mannár, and a silt-sluice similar to the sluices in the Giant's tank.	Clearing site of works ...	100 acres	40	0	4,000	0
	Earthwork	70,200 cubes	1	0	70,200	0
	2nd class concrete ...	31 cubes	60	0	1,860	0
	Masonry	400 cubes	50	0	20,000	0
	Brickwork	40 cubes	40	0	1,600	0
	Lime concrete	3 cubes	25	0	75	0
	Pitching	17 squares	25	0	425	0
	Planks with hooks ...	80 sq ft.	0	50	40	0
	Planking in bridge ..	160 sq. ft.	0	25	40	0
	Timber in do. ...	400 cub. ft.	2	50	1,000	0
	Gauge, fixed	—	—		150	0
	Iron sluice, fixed	—	—		300	0
	Ironwork in bridge, erected ..	—	—		9,350	0
	Transport of ironwork ...	—	—		580	0
					109,620	0
	Contingencies, 10 per cent. ..				10,962	0
			Total		120,582	0
Item No. 3—Restoration of Giant's Tank.						
This item provides for the restoration of the Giant's tank, as shown on the drawings and sections, and in accordance with the description contained in the report on it, so as to hold up 16 feet of water. It includes all masonry works at the tank itself, whether in the sluices, road-culverts, or flood-escape.	Clearing site of works ..	160 acres	20	0	3,200	0
	Earth-filling in embankment ...	173,200 cubes	1	20	211,840	0
	Earth-excavation at flood-escape ...	3,000 cubes	1	0	3,000	0
	Puddle ..	43,500 cubes	2	0	87,000	0
	Pitching on embankment ...	7,000 squares	10	0	70,000	0
	Pitching at waste weir ...	30 squares	20	0	600	0
	1st class concrete	28 cubes	80	0	2,240	0
	2nd class concrete at waste weir ...	66 cubes	60	0	3,960	0
	2nd class concrete in sluices ...	164 cubes	55	0	9,020	0
	Brickwork in sluices ...	377 cubes	40	0	15,080	0
	Rough walling at culverts ..	31 cubes	25	0	775	0
	Planks, with hooks ...	640 sq ft.	0	62½	400	0
	Gratings	8	80	0	640	0
	Iron sluices, fixed ...	8	300	0	2,400	0
	Ironwork in culverts, fixed ...	5	320	0	1,600	0
	Transport of do. ...	—	—		225	0
					411,980	0
	Contingencies, 10 per cent ...				41,198	0
			Total		453,178	0
Item No. 4—Formation of Distributing Channels.						
This item approximately provides for opening main channels of distribution from the sluices in the Giant's tank to the fields to be irrigated, and for constructing the necessary outlets, &c., on them, and any other masonry works needed.	—	—	—		50,000	0
Item No. 5—Non-effective Charges.						
This item provides for the erection and upkeep during construction of the works, of all buildings, lines, bungalows, hospitals, stores, workshops, &c., for the transport of all tools and material other than lime, cement used for concrete, and ironwork used in bridges and culverts; and for the maintenance of the works in good order until the completion of the whole.	Lines and buildings ..	—	—		18,000	0
	Transport of tools and materials ...	—	—		5,000	0
	Maintenance of works ..	—	—		5,000	0
					28,000	0
	Contingencies, 10 per cent. ..				2,800	0
			Total ...		30,800	0

ABSTRACT ESTIMATE.

			Rs.	cts.
Item No. 1	...	Construction of Catchwater Reservoir ...	404,305	0
„ *No.* 2	...	Formation of Supply Canal	120,582	0
„ *No.* 3	...	Restoration of Giant's Tank ...	453,178	0
„ *No.* 4	..	Formation of Distributing Channels ...	50,000	0
„ *No.* 5	...	Non-effective Charges ...	30,800	0
		Total .. Rs.	1,058,865	0

HENRY PARKER,
Irrigation Officer.

Colombo, November 24, 1881.

XLII.—1881.

IRRIGATION WORKS.

RETURN OF IRRIGATION WORKS EXECUTED IN THE SEVERAL PROVINCES OF THE ISLAND FROM 1868 TO 30TH JUNE, 1881.

Ordered by His Excellency the Governor to be Printed.

COLOMBO:
GEORGE J. A. SKEEN, GOVERNMENT PRINTER, CEYLON.

1882.

RETURN OF IRRIGATION WORKS EXECUTED IN THE SEVERAL PROVINCES OF THE ISLAND FROM 1868 TO 30th JUNE, 1881.

RETURNS BY THE SEVERAL GOVERNMENT AGENTS

Name of Work.	Date of Commencement.	Date of Completion.	Estimated Extent capable of Irrigation.	Actual Extent under Cultivation.	Extent of Land belonging to Government.	Extent of Government Land sold.	Amount realized by Sale	Amount realized on Water Rate	Amount due on Water Rate
Western Province.			A. R. P.	A. R. P.	A. R. P.	A. R. P.	Rs. cts	Rs. cts.	Rs cts.
Colombo.									
Boralęsgamuwa tank	July, 1868	Dec 1868	295 0 12	260 0 0	2 0 0	—	—	3,509 9	66 12 *a*
Kęsbęwa tank	Sept. 1872	Oct. 1872	75 0 0	75 0 0	—	—	—	—	— *b*
Ratnapura.									
Opanaiké	Oct. 1869	Feb 1870	12½ amunas	12½ amunas	—	—	—	923 70	Nil *c*
Kinchiguna	do.	Dec 1870	48 ,,	A. R. P. 46 3 29	A. R. P. 20 0 19	A. R. P. 20 0 19	810 0	1,092 28	— *d*
Malwatta	May, 1871	Nov. 1872	49 ,,	12 amunas	4 amunas	—	—	2,598 52	—
Walalgoda...	do.	Dec. 1872	A R. P. 270 2 35	A. R. P 67 0 0	A. R. P. 60 0 28	44 0 28	538 0	2,509 14½	2,216 95½ *e*
Kalutara.									
Bolabotuwęwa	1st Aug., 1876	2nd Mar., 1877	103 0 0	103 0 0	—	—	—	—	— *f*
Raigama (*alias*) Uyanawattęwęwa	18th Nov., 1876	30th Nov, 1879	175 0 0	175 0 0	—	—	—	—	—
Remunewęwa	22nd Jan., 1877	30th June, 1881	169 0 0	169 0 0	—	—	—	—	—
Medagamawęwa	10th May, 1877	10th July, 1879	116 0 0	116 0 0	—	—	—	—	—
Alutgama, Mahawęwa, and Kudawęwa ..	do.	8th Jan, 1881	82 0 0	82 0 0	—	—	—	—	—

a. The amount of water-rate due is Rs. 3,575—20 to be paid in ten yearly instalments. The 1st, 2nd, and 3rd instalments have been fully paid up.

The balance of the other instalments, which is as follows, is being recovered:—

	Rs. cts
4th Instalment due 30th June, 1872 ...	5 14
5th do. do 1873 ...	9 43
Carried over...	14 57

	Rs cts.
Brought forward...	14 57
6th Instalment due 30th June, 1874 ...	7 9
7th do. do 1875 ...	10 48
8th do. do 1876 ...	13 15
9th do. do. 1877 ...	9 96
10th do. do. 1878 ...	10 87
Total...Rs	66 12

b. The sluice and spill-water were constructed by Government gratis No water-rate due.

c. The amount realized was paid in ten instalments.

d. The cultivators after paying instalments of one-tenth cost for a short time have elected to pay a perpetual tax of Rs. 1 per acre First instalment became due in 1871.

e. The owners have applied to be allowed to commute the repayment by instalments for a perpetual payment of Rs. 1 per acre.

f. No water-rate is due.

IRRIGATION WORKS—*continued.*

Name of Work.	Date of Commencement.	Date of Completion	Estimated Extent capable of Irrigation.	Actual Extent under Cultivation.	Extent of Land belonging to Government.	Extent of Government Land sold.	Amount realized by Sale.	Amount realized on Water Rate.	Amount due on Water Rate.
			A. R. P.	A. R. P.	A. R. P.	A. R. P.	Rs. cts.	Rs. cts.	Rs. cts.
North-Western Province.									
Kurunegala.									
Kudugalapitiya *a*	Dec 1870	Dec. 1871	390 0 0	287 3 3	0 3 29	49 2 38	2,304 0	5,577 21	3,723 1
Wenoruwewa . . .	June, 1871	July, 1874	419 3 3 *b*	200 2 18 *c*	6 1 17	—	—	1,089 60	— *d*
Magalawewa .. .	Aug. 1871	Dec. 1873	2,000 0 0	505 1 39	1,744 2 1	255 1 39	2,426 75	1,586 24	
Galgomuwa...	Nov. 1875	June, 1877	500 0 0	381 3 17	—	—	—	834 34½ *e*	—
Mediyawa	July 1878	Aug 1879	535 0 20	354 0 20	183 2 20	39 0 36	203 50 *f*	—	—
Puttalam.									
Deduru-oya Channel	Feb 1872	Dec. 1872							
Do. Head Sluice	March, 1870	Nov. 1872	1,100 0 0	1,100 0 0	—	264 0 3	2,740 0	—	— *g*
Do Dam	March, 1878	Not complete							
Timipitiyawewa	Nov. 1870	Oct 1874	1,220 0 0	542 0 0	400 0 0	170 0 0	3,400 0	5,228 13	825 95
Galkulam	May, 1869	Nov. 1869	60 0 0	55 0 0	—	—	—	347 41½	82 48½
Maha-uswewa	May, 1876	Incomplete	1,200 0 0	—	1,064 1 31	135 2 9	1,224 25	—	—
Central Province.									
Badulla.									
Alut-ela	Sep 1868	Sep. 1869	300 0 0	292 0 0	26 0 0	—	—	2,882 88	1,203 52 *h*
Buttala-ela	Nov. 1868	Dec. 1869							
Do.	June. 1871	Oct. 1872	—	727 0 0	97 0 0	—	—	5,803 34	3,319 42 *i*
Do.	Dec. 1872	Dec 1872							
Do.	July, 1873	Sep. 1873							
Horaborawewa	Nov. 1869	Sep. 1870							
Do.	Dec. 1872	June, 1873	3,000 0 0	325 0 0	113 0 0	192 2 19	3,086 0	2,024 77	3,063 92 *j*
Do.	Nov. 1873	Dec. 1873							
Kudáwewa	Oct. 1869	July, 1870							
Do.	Nov. 1870	Dec. 1870	250 0 0	—	2 0 4	87 1 26	1,759 25	—	— *k*
Do.	Dec. 1872	July, 1873							
North-Central Province.									
Bassawakkulama	1873	1876	800 0 0	20 0 0	788 0 0	80 0 31	1,365 0	20 0	—
Madawachchiya Mahawewa . .	1873	1876	300 0 0	37 2 8	225 0 0	41 0 11	630 0	45 0	—
Tisawewa	1878	1880	2,500 0 0	—	2,467 0 0	32 3 30	407 0	—	—

a. The original estimate was Rs. 9,090 for an anicut and Rs 4,910 for a channel; when a certain expenditure had been incurred on the latter, it was found that it would cost another Rs. 10,000 to complete it, and it was abandoned.

b. Of this extent, 219 acres and 25 perches have not yet been assessed, because special channels are required to be opened from the tank to give them water.

c. This is the whole exent yet brought under assessment; of this, an extent of 10 acres 2 roods and 1 perch were brought under assessment in 1877, channels from the tank having been opened by the landowners.

d. Water-rate paid in perpetuity. Rate recovered from 1878.

e. No water-rate can be recovered on the Deduru-oya irrigation works until completion of the dam.

f This is only a quarter of the purchase amount of the lands, which were sold in terms of Sir Henry Ward's Minute of 27th February, 1857.

g This work is to have its cost defrayed by ten yearly contributions. The first repayment began in October, 1870. The amount of water-rate due is Rs. 4,086—40 to be paid in ten yearly instalments.

h Although the repayment of this work fell due in October, 1873, no payment was made until the 6th of January, 1875, instructions from Government as to the payment of the first annual instalment having been received in December, 1874.

i The repayment of this work fell due in 1873, but for reasons stated above the first annual payment was in November, 1874. The water-rate due for the ten yearly instalments is Rs. 5,654—10. Some of the lands sold have become forfeited.

j. The repayment of this work has fallen due, but the purchasers have not complied with the conditions of sale.

k. Payment of water-rate commenced, 1881.

IRRIGATION WORKS—*continued.*

Name of Work.	Date of Commencement.	Date of Completion.	Estimated Extent capable of Irrigation.	Actual Extent under Cultivation.	Extent of Land belonging to Government.	Extent of Government Land Sold.	Amount realized by Sale.	Amount realized on Water Rate.	Amount due on Water Rate.
			A. R. P.	A R P	A R P.	A. R P.	Rs. cts.	Rs cts	Rs. cts.
Southern Province.									
Galle.									
Digoda	1872	1873	123 3 24	123 3 24	—	—	—	1,598 29	4,024 35 *a*
Hambantota.									
Udukiriwila	1871	1873	2,500 0 0	2,500 0 0	1 0 0	—	—	8,628 70	—
Tissamaharama	1871	1876	Unascertained: possibly 15,000 0 0	727 0 0	All left unsold	1,928 1 26	21,512 75	—	—
Matara.									
Borala Tank	1868	1869	423 0 0	423 0 0	—	—	—	1,350 0	—
Kekanadura Tank and Channel .. .	1869	1872	2,000 0 0	1,031 0 0	—	—	—	5,052 13	— *b*
Denagama and Weangwewa	1868	1873	2,350 0 0	767 0 0	—	—	—	2,884 0	282 33
Wehella Tank	1873	1873	75 0 0	75 0 0	—	—	—	362 51	—
Gangaboda Pattu Scheme									
Hali-ela Tank	1871	1872		220 0 0	—	—	—	6,400 26	49 50
Sapugoda Anicut	1871	1872		306 2 0	—	—	—	1,843 30	13 0
Urapola Anicut .. .	1871	1873		1,377 2 20	—	—	—	Included under Háli-ela.	
Batuwita and Uduwa Channels	1871	1874		—	—	—	—	—	—
Ellawella Tank	1873	1876	7,000 0 0	1,093 0 0	—	—	—	5,331 17	—
Hali-ella Channel	1873	1877		—	—	—	—	—	—
Sapugoda Head Sluice	1873	1873		—	—	—	—	—	—
Pettre Anicut	1873	1877		788 1 3	—	—	—	2,155 95	13 80
Alawatugoda Anicut ...	1874	1877		335 1 20	—	—	—	948 50	7 0
Dandeniya Tank	1877	1879	627 0 0	420 0 0	—	—	—	420 0	—
Eastern Province									
Batticaloa. (c)									
1. Rúkam	June 1868	Nov. 1872	12,000 0 0	6,102 2 25	2,298 0 6	2,653 3 18	39,754 0	26,513 38	36,925 35
2. Ampárai extension	April 1872	Dec 31, 1873	12,000 0 0						
3. Senkappadai	July 1870	Sep 30, 1872	14,000 0 0						
4 Kurunalkanchi	do.	May 10, 1871	12 000 0 0	22,596 3 14	1,239 3 18	2,052 0 22	53,345 50	28,878 27¼	54,804 81½
5. Alada-odai	April 1872	Nov. 1872	6,000 0 0						
6. Vaddai Vayikkal	do.	do	5,000 0 0						
7. Pulukanawa	Feb 1871	Dec. 1872	3,500 0 0	4,000 1 4	696 1 12	4,136 1 4	79,755 0	— *d*	— *d*
8. Kadukkamunai . ..	Mar. 4, 1870	Dec. 1871	3,000 0 0	3,000 0 0	1,710 2 10	—	—	3,894 66½	10,623 90¼
9 Divulana	July 1870	Nov 30, 1872	3,000 0 0	4,000 0 0	1,468 0 7	3,058 1 39	35,020 75	2,012 98½	28,740 0
10. Chadiyantaláwa	April 1872	Dec 1873	3,000 0 0	3,000 0 0	775 3 24	1,774 3 34	39,223 0	6,330 93½	26,170 40¾
11. Sakamatukulam	Feb. 1871	Dec. 1872	3,000 0 0	1,239 1 11	80 2 16	1,213 0 0	18,112 0	— *e*	25,453 87½
Trincomalee.									
Allaikulam . .	July 1868	Nov.. 1873	4,000 0 0	1,478 2 24	474 2 16	924 3 0	25,181 50	20,375 17	21,127 55
Periyakulam	June 1868	Dec 1872	867 0 0	219 0 33	398 0 20	156 0 4	3,336 50	3,731 39	4,025 91

a Water-rate commenced to be recovered only since 1877, as the sluice did not work properly. The amount of water-rate due is Rs. 4,024—35, to be paid in ten yearly instalments

b. This tank has a bad water shed, and the extent cultivated is therefore irregular and dependent on the amount of water stored.

c. The cost of the original estimate is payable by ten annual instalments. When the actual expenditure has exceeded the estimate, the difference is not recoverable.

d The survey is complete, but the assessment is not complete, because a correct list for assessment cannot safely be made till levels have been run to the outlying lots, as reported by the Surveyor-General by letter No. 68 of 12th September, 1875.

e. In the case of Sagamam tank the assessment on the actual expenditure having been represented through medium of petition to be very hard upon landed proprietors, the rate has been reduced by Government to one rupee per acre payable in fifteen annual instalments. Here a large extent of land assessed is also said not to be irrigable from the tank by the existing means, which require improvement Until this is done recoveries will be made only from such as are actually cultivated and irrigated, of which the first instalment will be recovered before the close of the year

The crop of 1881 failed owing to insufficiency of water in the tank, which needs enlargement.

RETURN OF IRRIGATION WORKS BY THE DIRECTOR OF PUBLIC WORKS.

Name of Tank, Anicut, or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	Remarks.
Western Province			Rs. cts.	Rs. cts.	Rs. cts.	A. R. P.	
Boralesgamuwa Lokuwewa	July, 1868	Dec 1868	3619 0	—	3574 87½	300 0 0	Actual acreage. Formerly the whole of this acreage was cultivated once a year. Now the whole is annually cultivated, and a portion sometimes twice.
Do. re-constructing sluice, foot-bridge ...	Aug 1876	Dec. 1876	—	220 0	38 71		
			3619 0	220 0	3613 58½		
Malwatta Irrigation channel ...	May, 1871	Nov. 1872	5640 0	—	5199 7	150 0 0	Area from Government Agent's returns.
Kinchiguna do ...	Oct. 1869	Dec. 1870	5787 38	—	5771 32	112 0 0	do. do.
Opanaike aqueduct ...	do	Feb. 1870	920 0	—	917 15	30 0 0	do. do.
Walalgoda irrigation channel ...	May, 1871	Dec. 1871	7967 50	—	7871 96	400 0 0	do. do.
Do. additional work ...	Nov. 1872	Dec 1872	300 0	980 0	1280 0	—	Rs. 500 of this is for outlet sluice; Rs. 150 Govt. share in clearing the channel; Rs. 620 increasing masonry and regulating sluice and head works—Total, Rs. 1,280.
			8267 50	980 0	9151 96		
Bolubotuwewa sluice and spill	Nov. 1876	July, 1877	—	830 0	798 98		
Remunuwewa masonry and two sluices	Feb. 1877	Dec. 1877	—	1036 0	1031 11		
Remunuwewa additional works to sluice and spillwater ...	May, 1878	Sep. 1878	—	450 0	412 93		
			—	1486 0	1444 4		
Uyanewattewewa masonry and low-level sluice	April, 1877	April, 1878	—	2084 0	2083 89		
Uyanewattewewa repairs and additions	Jan 1878	April, 1878	—	2035 0	2035 0		
			—	4119 0	4118 89		
Masonry work and three sluices in Mahawewa and Kudawewa, Raygam-korale ...	April, 1877	June, 1878	—	1518 0	1517 68		
Medagamawewa additional work	Feb. 1878	Oct. 1878	—	1430 0	1422 87		
Petiyagoda sluice	June, 1875	Nov. 1876	—	3030 0	3025 57		
Kesbewa tank ...	Sep. 1872	Oct. 1872	—	590 0	589 63	—	Sluice and work in sluice channel given by Government.
Eastern Province.							
Periyakulam Nilaveli	Aug. 1868	Nov. 1869	10167 0	—	10166 26	867 0 0	Acreage estimated.
Do. extra works .	Nov 1872	Dec. 1874	—	4599 48	4596 55	—	For extra works considered to be necessary by Messrs. MacBride and Arniel.
Do completion of bund	Aug. 1873	Oct 1873	—	861 0	860 26	—	To complete work, former estimate being insufficient.
Do. repairs to bund ...	Nov. 1871	Dec. 1871	—	267 0	264 67		
Do. channel ..	April, 1870	Oct. 1870	1628 0	—	1571 91	—	Channel to the fields. This was at first intended to be cut by the people, but they applied afterwards for Government aid.
Periyakulam channel to Nilaveli	July, 1872	Dec. 1872	2381 0	—	2381 0		
Do. repair and improvement of tank and channel ...	Oct. 1874	Oct. 1875	—	5371 0	5018 27		
			14176 0	11098 48	24858 92		
Allaikulam, Topur ...	Aug. 1868	Nov. 1868	26740 0	—	26739 94	4000 0 0	Acreage estimated includes lands at Mutur.
Do. repair of breach ...	Mar. 1872	Mar. 1872	—	220 0	204 88		
Mutur channel ...	April, 1870	do.	15360 0	—	15283 60	—	To take water to the head of the fields at Mutur.
Allaikulam strengthening, and Mutur channel completion ...	Nov. 1872	Dec. 1872	—	3828 44	3821 94	—	Recommended by Messrs. Arniel and MacBride.
Allaikulam and Mutur channel, raising and strengthening bund and channel ...	Oct. 1874	Dec. 1875	—	11308 0	11294 42	—	
Mutur channel extension ...	July, 1872	Dec. 1873	7892 80	—	7887 67	—	To carry the channel from the head of the fields along the tract.
Do. do. ..	Dec. 1877	Dec. 1878	—	1740 0	1649 49	—	
Carried forward...	—	—	49992 80	17096 44	66881 94		

Name of Tank, Anicut or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	Remarks.
			Rs cts.	Rs. cts.	Rs. cts.	A. R. P.	
[Brought forward ...	—	—	49992 80	17096 44	66881 94		
Eastern Province—*contd.*							
Mutur branch extension ...	Dec. 1873	Dec. 1873	—	1008 0	931 57	—	Ordered to be executed by Government.
Repairs, Allai tank ...	June, 1878	Nov. 1878	—	1410 0	297 71	—	Leaks only have been repaired.
Allai tank, repairs and additions to ...	June, 1880	Dec. 1880	—	5276 0	4409 44		
New channels to Periya Valley.	Mar. 1878	Nov. 1878	—	12370 0	4912 70	—	Channel only was opened.
			49992 80	37160 44	77433 36		
Kanthalai high-level sluice ...	July, 1869	Dec. 1869	—	2271 0	2264 21	—	A commencement of the repair by Government of this tank.
Do. fixing rods of T iron.	Aug. 1872	Oct. 1872	—	121 0	104 92	—	Rate for ironwork in former estimate too low.
Repairs, Kanthalai tank ...	July, 1877	Dec. 1878	—	3950 0	3862 20		
Kanthalai channel cutting ...	Dec. 1873	Dec. 1874	—	4263 0	4166 53		—
Do. complete repair of tank	April, 1874	Dec. 1876	—	71709 0	61449 60½	22000 0 0	For the complete repair. Acreage estimated. Not repaired under the Ordinance, but water rate will be charged on the lands irrigated.
Kanthalai, retaining wall to distributing sluice .	Aug. 1880	Nov. 1880	—	358 0	207 95		
			—	82672 0	72055 41½		
Rukam-kulam ..	Aug. 1868	Dec. 1870	87360 0	—	86990 8	8000 0 0	This tank is really capable of irrigating over 8,000 acres.
Do. spur embankment	Nov. 1870	Mar. 1871	—	3700 0	3419 21	—	Found necessary to prevent scour from the river along the foot of the bund. This could not have been foreseen.
Rukam, extra work ...	Sep. 1871	Dec. 1872	—	4800 0	4799 88	—	Found necessary to make good the leaks through and under the spill-wall, and to provide gratings in front of the sluices.
Do. raising and strengthening bund ...	Aug. 1872	Dec. 1873	—	7898 0	7895 25	—	Recommended by Messrs. MacBride and Arniel to repair sinkage and slips in bund.
Do. strengthening spill-wall.	April, 1877	Aug 1877	—	8585 0	8393 35		
Do. repairs damage by flood	Jan 1878	Dec. 1878	—	12777 0	12600 13		
			87360 0	37760 0	124097 90		
Kadukkamunai-kulam ...	April, 1870	Dec 1871	26778 92	—	18181 34	3000 0 0	Acreage estimated from Government Agent's returns.
Do. do. ...	Oct. 1874	Nov. 1876	—	10274 0	10223 58	—	To make up sinkage and breaches by cattle, and to put up gratings before sluices
Do flood damage ...	Jan. 1878	Nov. 1878	—	500 0	485 60		
			26778 92	10774 0	28890 52		
Senkapadai anicut ..	July, 1870	Dec. 1871	41000 0	—	35025 6	14000 0 0	This and the four next works all belong to one scheme for the benefit of 24,000 acres of land, and must be considered as one work
Kurunelkanchi anicut ...	Sep. 1870	April, 1871	5000 0	—	4995 54	4000 0 0	
Kurunegangi anicut, raising ...	Mar. 1880	Oct. 1880	—	990 0	989 97		
Do do. improving	Jan. 1880	Nov. 1880	—	1173 0	1164 94		
Vaddai Vaykal anicut ...	April, 1872	Dec. 1872	8068 0	—	6221 64	8000 0 0	
Alladai Odai anicut ...	do.	do.	14748 0	—	13458 78		
Alladi Odai anicut, raising ...	July, 1879	Oct. 1879	—	410 0	409 86		
Amparai, extension of tank ...	April, 1872	Dec. 1873	31364 0	—	28596 83	—	This tank and Irrikamam between them water 24,000 acres of land.
Irrikamam and Ambara ...	Sep. 1876	Dec. 1878	—	8790 0	7136 16	—	For fixing new iron sluice gates in place of old wooden gates.
Irrikamam tank, raising bund	April, 1879	Nov. 1879	—	3960 0	3925 46		
Irrikamam bund, completing raising	April, 1880	Dec. 1880	—	1950 0	1924 77		
Carried forward...	—	—	100180 0	17273 0	103849 1		

Name of Tank, Anicut or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	Remarks.
			Rs. cts.	Rs. cts.	Rs. cts.	A. R. P.	
[Brought forward ...	—	—	100180 0	17273 0	103849 1		
Eastern Province.—*contd.*							
Irrakkamam channel ...	Oct 1877	Oct 1878	—	9770 70	8647 7	—	For improving storage of tank, provides for skilled labour only.
Irrakamam, supply channel ...	Jan. 1880	Not compd	43250 0	—	31513 42	—	Expenditure up to 31st December, 1880.
Irrakamam channel, additions to	Aug. 1880	Do.	—	3490 0	1678 82	—	Expenditure up to 31st December, 1880.
Damage, Ambari tank ...	Sep. 1878	Dec. 1878	—	500 0	493 70		
Sagamata-kulam ...	Mar. 1871	Dec. 1872	37110 0	—	37095 78	2400 0 0	Acreage estimated out of a larger tract.
Do. additional works ...	Nov. 1872	Oct 1873	—	8652 0	8651 39	—	Recommended by Messrs. MacBride and Arniel for extra work to sluice, strengthening bund and extra spill, not originally contemplated owing to erroneous survey.
Do. completion ...	May, 1873	Dec. 1874	—	7487 16	6695 37	—	First supplementary estimate insufficient
Sagamata-kulam, repairing leaks to spill-wall ..	July, 1879	Dec. 1880	—	198 0	192 34		
			180540 0	47370 86	198816 90		
Devilane-kulam ...	Sep. 1870	Dec 1872	34896 54	—	34896 54	5100 0 0	Acreage estimated to be benefited out of a larger existing tract.
Do. first supplementary ...	June, 1872	Aug. 1872	—	3868 0	3867 30	—	To meet insufficient provision in original estimate, and for extra works in the spill.
Do. second supplementary, completion ...	Aug 1872	Dec. 1873	—	5160 65	5160 64	—	Insufficient provision in first supplementary estimate.
Do. damage by floods ...	June, 1878	Aug. 1879	—	30000 0	29994 57	—	For repair of drainage and giving extra spill.
Devilane-kulam, completing repair of damages ...	May, 1879	July, 1879	—	2530 0	2530 0		
			34896 54	41558 65	76449 5		
Chadiyantalawa-kulam ...	April, 1872	Nov 1873	54146 0	—	54144 89	3000 0 0	Estimated to be benefited out of a larger existing tract.
Do. completion ...	Dec. 1873	Dec. 1873	—	1785 0	1782 1	—	Rate of earthwork in original estimate too low.
Do. restoring damage done by floods ...	Oct. 1874	Dec. 1874	—	517 0	507 78		
Do. damage by floods ...	Aug. 1878	Sep 1878	—	500 0	57 86		
			54146 0	2802 0	56492 54		
Kalmunai sluice ...	June, 1869	Dec. 1869	—	319 0	317 25	—	Built at the request of Government Agent as an example.
Puliakanawa-kulam ...	Mar. 1871	Dec. 1872	38560 0	—	38396 58	3500 0 0	Acreage estimated to be benefited out of a larger tract.
Do. extra works ...	Nov. 1872	June, 1873	—	9991 50	9989 99	—	Work found to be more difficult than expected, and survey found to be in error.
Do. completion ...	April, 1873	Dec. 1873	—	7848 50	7825 55	—	First supplementary estimate insufficient.
Do. damage ...	Jan. 1878	Dec. 1878	—	5000 0	3472 59	—	For repairing damage and increasing spill.
			38560 0	22840 0	59684 71		
Re-construction of an earthen dam across the Marodiaddi-aar	Oct 1875	July, 1877	—	3920 0	3919 19		
Repairs to Maha Panowa tank...	do.	do.	—	7002 95	7002 93		
For masonry sluices required in the restoration of the bunds between Kiddanke and Torunulawewa ...	Oct. 1878	—	—	1231 0	—	—	This work was not carried out by the Public Works Department.
Maha-oya tank repairs .	Mar 1879	Oct. 1879	—	8330 0	8330 0	about 200 acres.	
Suriyadi anicut ...	Mar. 1879	Oct 1879	5020 0	—	4938 34		
Kaliodai anicut ...	July, 1879	Dec. 1879	19700 0	—	19666 24		
Kaliodai anicut, completion .	Jan. 1880	July, 1880	—	930 0	777 39		
Pattampatti anicut ...	Jan. 1880	Dec. 1880	40700 0	—	31537 60		
Pattampatti anicut, a wall in connection with ...	June, 1880	Sep. 1880	—	3410 0	2547 81		
Seven head sluices ...	Mar. 1880	Dec. 1880	—	7700 0	4063 75		
			65420 0	20370 0	71861 13		

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			Rs. cts.	Rs. cts.	Rs cts.	A. R. P.	
North-Central Province.							
Bassawakkulam repair ...	June, 1874	July, 1876	—	39165 0	39100 17	—	Water-rate to be charged on lands irrigated, at one rupee per acre.
Do. completion ...	June, 1876	June, 1877	—	11338 0	11312 57		
Do. bund, rendering safe	Feb 1879	Dec. 1879	—	17600 0	10293 0		
			—	68103 0	60705 74		
Maha Madawachchiya tank, repairs . .	June, 1874	May, 1876	—	24831 0	24831 0	—	do. do.
Do. do ...	April, 1874	do.	—	1400 0	1399 83		
			—	26231 0	26230 83		
Mankadawalawewa ...	June, 1875	Oct 1875	—	1088 0	1088 0	65 0 18	
Bulankulamawewa .	Mar. 1875	April, 1875	—	1088 0	931 77	22 0 16	
Alankulamawewa .	do.	do.	—	1088 0	943 11	35 0 0	
Mahadiwulwewa ..	June, 1875	Aug. 1875	—	1088 0	1076 48	80 0 0	
Do. second sluice...	May, 1876	July, 1875	—	814 0	814 0		
			—	1902 0	1890 48		
Etakadawewa .. .	Oct. 1875	Dec. 1875	—	1088 0	1047 79	142 0 0	
Gurukandegamawewa ..	June, 1874	May, 1875	—	1088 0	1088 0	6 2 0	
Do. second sluice	Nov. 1875	Dec. 1875	—	114 0	106 99		
			—	1202 0	1194 99		
Nelugollekadewewa .	June, 1875	July, 1875	—	1088 0	1087 77	17 2 0	
Kudagamawewa Kanadara .	Jan 1876	April, 1876	—	1088 0	1075 86	25 2 0	
Rambewa	July, 1875	Sep 1875	—	1088 0	1088 0	16 0 0	
Peddogamawewa .	do.	Oct. 1875	—	1088 0	1006 51	17 2 0	
Alutbamillewewa	Oct. 1875	Dec 1875	—	1088 0	1018 58	24 0 0	
Dachchudamenawewa . .	July, 1875	Aug. 1875	—	1088 0	1075 73	6 2 0	
Kongollewewa	Sep 1875	Nov 1875	—	1088 0	1082 34	17 2 10	
Wadiwewa	Oct. 1875	do.	—	1088 0	975 26	41 0 0	
Halukumbukgollewewa	Sep 1875	do	—	1088 0	936 86	7 0 8	
Lunupichchudamanawewa .	Aug 1875	Sep 1875	—	1088 0	1003 52	10 0 0	
Tammanawewa No. 1 .	July, 1875	Aug 1875	—	1088 0	1084 15	13 0 0	
Do No 2 ..	Aug 1875	Oct 1875	—	1088 0	1083 83	8 0 0	
Etawiragollewewa .	June, 1875	Sep. 1875	—	1088 0	1047 92	40 0 0	
Malawawewa .	Oct 1875	Dec. 1875	—	1088 0	1024 17	64 0 0	
Rambewa	Nov 1875	Jan 1876	—	1088 0	1088 0	13 2 18	Repaired on the Village Tank system—Government executes masonry work, people doing the earthwork.
Helambagaswewa ...	do	do.	—	1088 0	1019 54	36 0 0	
Ullukulamawewa ...	Jan 1876	May, 1876	—	1088 0	1088 0	26 0 0	
Padiyankadawala ..	Nov 1875	Dec. 1876	—	1088 0	1076 78	—	
Pustyankulamawewa ...	April, 1876	May, 1876	—	1088 0	1088 0	79 2 0	
Galligamawewa .	Jan. 1876	May, 1876	—	1660 0	1652 31	15 2 0	
Do per spill .	Dec 1875	Jan. 1876	—				
Lollugaswewa .	Nov. 1875	do.	—	1088 0	1088 0	6 2 0	
Mahadiwulwewa, per spill ...	Jan 1876	Mar 1876	—	850 0	744 40	—	
Etambagaskadawewa ..	Mar. 1876	May, 1876	—	1088 0	1088 0	23 0 0	
Do. per spill ..	April, 1876	do.	—				
Mahakubukgollewewa ..	Mar. 1876	April, 1876	—	1088 0	1088 0	58 0 0	
Punewawewa .	April, 1876	May, 1876	—	1088 0	1086 90	41 0 2	
Kudahamillewewa ..	do.	do.	—	1088 0	1005 44	21 0 0	
Piambulagaswewa ..	May, 1876	June, 1876	—	1088 0	1078 62	24 2 2	
Watrakawewa	Mar 1876	do	—	1088 0	1087 94	20 0 0	
Mahakekirawawewa	May, 1876	do.	—	1088 0	1044 77	53 2 0	
Kudakekirawawewa ..	do.	do	—	1088 0	1088 0	33 0 10	
Kirrigollewewa ...	July, 1876	Sep 1876	—	1088 0	1088 0	26 0 0	
Do. per spill ...	do	do.	—				
Tirapanewewa ...	do.	do.	—	1088 0	1088 0	59 2 20	
Alitanewewa ...	July, 1876	Sep 1876	—	1088 0	1088 0	28 0 20	
Maradankadawalawewa .	Sep. 1876	Oct 1876	—	1088 0	1087 82	57 0 0	
Nillatapitiyawewa .	do	do.	—	1088 0	1021 20½	9 0 0	
Periyakulamawewa ...	Oct 1876	Dec. 1876	—	1088 0	1088 0	34 2 26	
Hamillekulamawewa ...	do.	do.	—	1088 0	1088 0	22 2 0	
Paranahamillewewa ..	do.	Nov. 1876	—	1088 0	1088 0	10 2 0	
Kurukandegamawewa, per spill	do.	Dec. 1876	—	850 0	839 27	—	
Kusawawewa ...	do	Nov. 1876	—	800 0	800 0	32 2 12	
Do. per spill ...	Nov. 1876	Dec. 1876	—	850 0	850 0	—	
Bilapanawewa No. 1. ...	Oct 1876	Nov. 1876	—	1088 0	1088 0	121 2 0	
Do. No. 2. ...	Nov 1876	Dec. 1876	—	1088 0	1088 0	—	
Uttimaduwawewa ...	do	do..	—	1088 0	1039 3	75 0 0	
Mahakekirawa ...	Jan. 1877	Mar. 1877	—	850 0	632 13	—	

Name of Tank, Anicut or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	Remarks.
			Rs cts	Rs. cts.	Rs. cts.	A. R P	
North-Central Province.—*contd.*							
Kadawatgamawewa ...	Nov. 1876	Mar. 1877	—	1088 0	1062 62	19 2 0	Repaired on the Village Tank system — Government executes masonry work, people doing the earthwork.
Sellatumaduwawewa ...	Jan 1877	Feb. 1877	—	1088 0	1030 55	19 2 0	
Orukmankulamawewa ...	Dec. 1876	Jan 1877	—	1088 0	1036 42	60 0 0	
Andarawewa ...	Nov 1876	Mar. 1877	—	1088 0	1076 11	48 0 0	
Adampanewewa ...	Feb. 1877	April, 1877	—	1088 0	1084 46	27 0 0	
Karadikulamawewa ...	do.	May, 1877	—	1088 0	1088 0	29 0 16	
Marudankulamawewa ..	Jan 1877	Mar 1877	—	1088 0	1056 39	20 0 28	
Werupankulamawewa ...	Mar. 1877	May, 1877	—	1088 0	1058 0	55 2 14	
Petianakadawewa ...	do.	June, 1877	—	1088 0	1078 72	70 0 10	
Nikatuuuwewa ...	April, 1877	do.	—	1088 0	1088 0	9 2 10	
Ratmalagahawewa .	Feb. 1877	May, 1877	—	1088 0	1088 0	36 0 10	
Ratmalewewa ...	May, 1877	June, 1877	—	1118 0	1118 0	30 2 16	
Paluwewa	do.	July, 1877	—	1118 0	1118 0	23 2 14	
Galkadawalawewa ...	June, 1877	Oct. 1877	—	1088 0	1086 93	72 0 0	
Ganguruwewa ..	do	Aug. 1877	—	1118 0	1105 69	19 2 12	
Kumbukwewa ...	May, 1877	July, 1877	—	1088 0	1088 0	62 0 8	
Palipotanewewa ...	do.	Sep 1877	—	1088 0	1065 73	11 2 0	
Ranawewewa ...	Aug 1877	Dec 1877	—	2224 0	2224 0	70 0 0	
Mahahulankulamewewa ...	do	do.	—	1118 0	1113 11½	51 0 12	
Kalpewewa ...	July, 1877	Aug. 1877	—	1118 0	1114 0	60 2 14	
Parangiwadiyawewa . .	Aug. 1877	Nov 1877	—	2165 0	2139 36	100 2 18	
Wewelketiyawewa ..	do.	do.	—	1118 0	1052 20	60 2 16	
Ralapanawewa No 1	Sep 1877	do.	—	1165 0	1109 32	72 0 18	
. Do. No. 2 ...	Oct. 1877	Jan. 1878	—	1165 0	1165 0	—	
Horowapotanewewa ...	Aug. 1877	Sep 1877	—	1145 0	1137 97	66 2 8	
Anaolundawawewa ...	Aug 1877	Nov 1877	—	1088 0	1077 70	7 2 22	
Diyatittewewa ..	Oct 1877	do	—	1088 0	1072 89	35 2 28	
Dachchilamillewewa	July. 1877	Aug 1877	—	664 0	664 0	20 0 12	
Welunopotanewewa ...	Jan. 1878	Mar 1878	—	1165 0	1159 38	73 0 4	
Tammanewewa ...	Nov. 1877	do	—	1118 0	1078 17	10 0 0	
Tamballagollewewa .	Aug. 1877	do.	—	1118 0	1062 47	57 0 12	
Maragahawewa ...	Oct. 1877	do.	—	1118 0	1089 2	41 0 10	
Pihimbiyagollewewa ...	do	do	—	1165 0	1161 16	18 2 14	
Mahabulan-kulama, per spill ...	do	do	—	.	—	—	
Talagahapotanewewa ...	Jan 1878	do	—	1118 0	1118 0	20 0 0	
Puddukulamawewa ...	do	do.	—	1148 0	1124 70	35 2 2	
Ellewewa ...	Sep. 1877	Jan. 1878	—	2224 0	1847 89	53 0 16	
Pubiyankulamawewa ...	Oct. 1877	Mar. 1878	—	2224 0	1769 86½	32 0 0	
Habarawewewa ...	Dec. 1877	April, 1878	—	2165 0	2160 37½	91 0 10	
Tambalagollewewa, per spill	Mar 1878	June, 1878	—	850 0	514 74	—	
Dachchilamillewewa, raising ...	do.	May, 1878	—	454 0	454 0	—	
Pihimbiyagollewewa, per spill...	Feb 1878	June, 1878	—	850 0	842 53	--	
Tirapankadawela, per spill ...	May, 1878	May, 1878	—	880 0	880 0	—	
Alugasgadawewa ...	do	do	—	1148 0	984 18	37 2 16	
Palugaswewa ...	Feb 1878	do.	—	1148 0	1101 91	57 0 10	
Hiriwadunuwewa ..	do	June, 1878	—	1196 0	1064 21	86 2 16	
Kokattiyagallewewa ..	Nov. 1877	do.	—	1165 0	1123 35	37 0 0	
Maradankadawela ...	Dec 1877	do	—	1165 0	1165 0	22 2 0	
Dutuwewa No 1 . .	Mar 1878	do.	—	1151 0	885 3	65 2 28	
Ratmalewewa . ..	April, 1878	do.	—	1195 0	1186 11	26 2 20	
Karasagollewewa Kalingula ...	Sep. 1878	Oct 1878	—	880 0	807 74	—	
Do sluice ...	Dec. 1877	Sep 1878	—	2195 0	1810 5	102 2 0	
Talatalawa ...	April, 1878	do	—	2224 0	1714 28	131 0 0	
Tamarahamillwewewa ..	Feb. 1878	do.	—	1195 0	1170 9	33 2 8	
Urapinuwewa	April, 1878	do.	—	880 0	765 84	—	
Galuweragallawa .	Feb 1878	do.	—	1195 0	1176 92	46 3 0	
Urapinuwewa ...	do.	do.	—	1195 0	1035 93	31 2 38	
Ambagahawewa	do.	do.	—	1148 0	1128 75	40 0 0	
Surukulam ...	—	—	—	1148 0	—*		
Horawapotana ...	June, 1878	June, 1878	—	50 0	40 0	—	Completed.
Yodi-ela channel ..	April, 1878	Mar 1880	—	89474 0	89430 70	—	Deviation bridge and spill at Tissawewa completed, line nearly cleared, and 1½ mile of channel (earthwork) completed.
Kepirigamawewa ...	April, 1875	Sep 1878	—	1196 0	1179 99	141 2 6	Repaired on the Village Tank system—Government executes masonry work, people doing the earthwork.
Hiriwadunnewewa ..	June, 1878	do.	—	880 0	324 75	—	
Dutuwewa No 2 ..	Mar. 1878	Dec. 1878	—	1151 0	980 11	62 2 28	
Dutuwewa ...	—	Sep. 1878	—	880 0	36 52	—	
Nambeduwewewa ..	April	Nov 1878	—	1195 0	1195 0	51 2 20	
Wannammaduwa ..	Nov. 1878	Dec. 1878	—	1191 0	1139 46	46 0 20	
Mahakapugollewa ...	Mar. 1878	Nov. 1878	—	2228 0	1770 43	58 0 28	
Ambagassewewa ..	do.	Aug. 1878	—	1195 0	1079 70	82 0 20	
Do per spill .	Sep. 1878	Sep 1878	—	880 0	559 51	—	
Unagaswewa ...	do.	Nov. 1878	—	1151 0	986 55	30 0 0	

* Withdrawn by request of Government Agent, as there is a tank (Puddikulam) adjoining, which is sluiced and the outlet of which is considered sufficient to supply the requirements of Surukulam. These two tanks are connected by a channel.

Name of Tank, Anicut, or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	Remarks.
North-Central Province—*contd.*			Rs. cts.	Rs cts.	Rs cts.	A. R. P.	
Mahakapugollewa spill ...	Sep 1878	Nov 1878	—	880 0	487 86	—	
Karambankulama ...	Aug. 1878	do	—	1151 0	1126 41	50 0 0	
Taranagollewa ...	Oct. 1878	Dec 1878	—	1151 0	1102 0	30 0 0	
Kiralogama ...	June, 1878	Aug. 1878	—	1151 0	1050 91	—	
Migassegama ..	do	do	—	1151 0	969 93	—	
Embulgassewewa ..	Sep 1878	Nov. 1878	—	1195 0	1070 86	—	
Wagollekada, spill ..	do.	Sep. 1878	—	2028 0	470 27	—	
Pahala Diwulwewa ..	do.	Nov. 1878	—	1196 0	907 36	—	
Ihala Diwulwewa .	do.	do.	—	1148 0	1002 95	—	
Dunwattegama .	do.	Oct 1878	—	1148 0	1118 50	—	
Pahala Kudapattiya ...	Nov. 1878	Dec. 1878	—	1191 0	1132 60	—	
Diwulwewa .	do	do.	—	1191 0	1129 67	—	
Relanapanawewa ..	do.	Jan 1879	—	1195 0	1129 41	45 0 0	
Rotawewa ...	Mar 1879	June, 1879	—	1195 0	1195 0	—	
Nekatunuwewa ...	Feb 1879	Mar. 1879	—	1151 0	1151 0	—	
Galkadawala ..	Dec. 1878	Feb. 1879	—	1195 0	949 43	—	
Kalanchiya ..	Dec. 1878	June, 1879	—	3376 0	3120 97	—	
Galapitiyagala .	Jan. 1879	April, 1879	—	2228 0	1971 75	—	
Kalu Ebbe ...	Mar 1879	Aug 1879	—	1195 0	1188 41	—	
Paluketuwewa ..	Oct 1878	Jan. 1879	—	1118 0	1071 79	—	
Ragnaikawewa .	do	do.	—	1118 0	1067 4	—	
Kakulbendidigiliya .	do	do.	—	1118 0	1036 7	—	
Ettakada outlet	Sep 1879	Sep. 1879	—	250 0	235 4	—	
Wadewewa, spill ...	Feb. 1879	Mar 1879	—	880 0	797 34	—	
Karambewewa ..	Mar 1879	May, 1879	—	1148 0	1019 90	—	
Relapanewa ..	do.	do.	—	1148 0	1123 28	—	
Angunachchiya .	April, 1879	May, 1879	—	1148 0	1137 33	—	
Minhittigama ..	May, 1879	July, 1879	—	1195 0	1174 47	—	
Hiriptiyawa ..	Mar 1879	June, 1879	—	1195 0	1026 88	—	
Hendagama .	Jan 1879	Mar 1879	—	1148 0	1129 28	—	
Kirigollewa ...	do	April, 1879	—	1148 0	1122 28	—	
Etawetunawewa ...	Dec. 1878	Jan 1879	—	1148 0	1123 59	—	
Lindawewa ..	April, 1879	May, 1879	—	1148 0	1133 76	—	
Dunumnegama .	do	do	—	1193 0	1153 38	—	
Gonnbeddanewa ...	Feb 1879	Sep 1879	—	1193 0	1152 41	—	
Udangawewa	Jan. 1879	May 1879	—	1193 0	1174 82	—	Repaired on the Village Tank system — Government executes masonry work, people doing the earthwork.
Walketuwewa ...	May. 1879	June 1879	—	1193 0	1147 5	—	
Hirellugama ..	June, 1879	Nov 1879	—	2969 0	2908 31	—	
Pahala Talawa ...	Mar. 1879	do	—	2228 0	2219 63	—	
Maha Bellankadawala	May, 1879	Aug 1879	—	1193 0	1176 25	—	
Walahawddawewa ...	Mar. 1879	May, 1879	—	1148 0	1126 22	—	
Muwa Etagama ...	April, 1879	Nov. 1879	—	5077 0	5072 9	—	
Wattewewa ...	do	May, 1879	—	1148 0	1131 32	—	
Kirigollewa	May, 1879	July, 1879	—	1056 0	1019 33	—	
Kirimetiyawa .	April, 1879	May, 1879	—	1148 0	1057 89	—	
Talgahawewa ...	May, 1879	Sep. 1879	—	1193 0	1183 30	—	
Weliwewa ...	June, 1879	Aug 1879	—	1193 0	1183 28	—	
Bahandewewa	do	Nov 1879	—	1193 0	1086 98	—	
Kirimetiyawa ..	May, 1879	Dec. 1879	—	1148 0	1123 17	—	
Kirigollewa, spill .	Nov. 1879	do	—	880 0	873 26	—	
Kulikkada ...	Oct 1879	do.	—	1148 0	1147 95	—	
Wiralmurippuwa ...	July, 1879	Nov. 1879	—	1193 0	1190 39	—	
Irrambakkulam ...	do	Oct 1879	—	2228 0	2227 91	—	
Siyambalagassewa ...	Aug 1879	do	—	1148 0	1146 62	—	
Kirimetiyawa ..	July, 1879	do	—	750 0	726 25	—	
Ratmalegahawewa ...	Sep 1879	Dec. 1879	—	750 0	629 57	—	
Kubukwewa .	June, 1879	Aug. 1879	—	1193 0	1078 59	—	
Puliyankulama ...	July, 1879	Sep. 1879	—	1148 0	1146 75	—	
Diwulwewa ...	June, 1879	do	—	2228 0	1679 55	—	
Kalawewa contour ..	Sep. 1879	Dec 1879	—	1060 0	712 73	—	
Periyakulama ...	July, 1879	July, 1879	—	118 0	118 0	—	
Nambadawewa spill ...	Mar. 1879	April, 1879	—	100 0	98 41	—	
Moragoda ...	Nov 1878	Feb. 1879	—	1191 0	1138 79	—	
Amane ..	Jan 1880	Mar 1880	—	1145 0	1096 23	—	
Helambewewa ..	April, 1880	July, 1880	—	1145 0	1089 16	—	
Tirappane ..	June, 1880	Sep. 1880	—	1145 0	1089 16	—	
Lenogama ..	July, 1880	Aug 1880	—	1145 0	1124 35	—	
Mankadawela, spill-wall ...	May, 1880	July, 1880	—	710 0	665 47	—	
Sippewewa ..	May, 1880	July, 1880	—	1145 0	1128 60	—	
Karappikadai ...	April, 1880	June, 1880	—	1907 0	1902 12	—	
Kidagalegame ..	Feb. 1880	Mar 1880	—	2913 0	2908 3	—	
Kudagama ..	do	April, 1880	—	1145 0	1131 21	—	
Periyakulama	Jan. 1880	do	—	2913 0	2828 49	—	
Ilakkewiddewewa ...	April, 1880	Aug 1880	—	2913 0	2899 94	—	
Mahakongaskada ..	Aug 1880	Oct. 1880	—	1194 0	1194 0	—	
Lindahittidamana ...	Nov. 1880	Dec. 1880	—	1145 0	1143 78	—	
Tammannekulama ..	Oct 1880	do.	—	1194 0	1193 4	—	

Name of Tank, Anicut or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	REMARKS.
NORTH-CENTRAL PROVINCE—*contd.*				Rs. cts.	Rs. cts		
[Brought forward ...	—	—	—				
Nawakkulama ...	Nov. 1880	Jan. 1881	—	1194 0	1193 13	—	Repaired on the Village Tank system—Government executes masonry work, people doing the earthwork.
Kidawarankulama ...	June, 1880	Aug. 1880	—	1145 0	1143 49	—	
Kudakumbukgollewa ...	April, 1880	June, 1880	—	1145 0	1112 49	—	
Anekettiyawa ...	Sep. 1880	Oct 1880	—	1145 0	1144 87	—	
Marakkalahammillewa ...	do.	do	—	1145 0	1144 85	—	
Kudakongaskada ...	June, 1880	Aug. 1880	—	1145 0	1144 88	—	
Pahala Talawa, spill-wall	Mar 1880	May, 1880	—	310 0	302 62	—	
Turuwila ...	do.	Dec. 1880	—	2913 0	2693 62	—	
Surukulam ...	do.	May, 1880	—	1145 0	1027 41	—	
Pahala Talawa, spill-wall ...	do	do	—	200 0	158 91	—	
Mediyawa ...	Sep 1880	Nov 1880	—	1145 0	1063 47	—	
Konwewa ...	June, 1880	Sep. 1880	—	1145 0	1126 26	—	
Elya Diulwewa ..	July, 1880	do.	—	1145 0	1118 86	—	
Hurigassewa ..	Sep. 1880	Dec 1880	—	1145 0	1088 13	—	
Rajjalegama ..	do.	do.	—	1145 0	1115 39	—	
Kirimetiyawa spill ...	Nov. 1880	do.	—	146 88	122 5	—	
Yakawewa ...	Feb. 1880	Mar. 1880	—	1053 93	1050 26	—	
Kuda Madawachchiya ...	Nov. 1880	Jan 1881	—	1191 0	1188 80	—	
Kalpewewa, spill	Dec. 1880	do.	—	250 0	249 7	—	
Andarawewa, spill ...	do.	Dec. 1881	—	250 0	208 25	—	
CENTRAL PROVINCE							
Alut-ela irrigation channel ...	Sep 1868	Sep. 1869	4500 0	—	4491 15	375 0 0	Acreage from Government Agent's returns
Improving Alut-ela ...	June, 1878	Dec 1878	—	1280 0	1246 18		
			4500 0	1280 0	5737 33		
Buttala-ela irrigation channel...	Nov. 1868	Dec. 1869	10560 0	—	5547 35	793 0 0	Acreage from Govt. Agent's returns. Part of the work estimated for not completed.
Buttala-ela new head sluice completion	June, 1871	Oct 1872	—	2577 35	7590 0	—	To complete portion omitted before Actual estimate, Rs. 7,590, which, added to prevous expenditure = Rs. 13,137·35. Deduct Rs. 10,500; balance Rs 2,577 35.
Buttala head works completion...	Dec 1872	Dec. 1872	—	3445 97	3428 72	—	Previous estimate not sufficient.
Do. do.	July, 1873	Sep 1873	—	248 0	245 48	—	For some small extra works, and removing native amuna, rubbish, &c
			10560 0	6271 32	16811 55		
Horaborawewa ..	Nov. 1869	Sep 1870	6950 0	—	6693 95	3000 0 0	Estimated acreage.
Do. extra works ..	Dec. 1872	June, 1873	—	4238 32	4201 28	—	For gratings in front of the sluices.
Do. well walling completion	Nov. 1873	Nov. 1873	—	286 0	284 70	—	Necessitated by increased cost of ironwork
			6950 0	4524 32	11179 93		
Kudawewa	Oct. 1869	July, 1870	6010 0	—	5778 89	250 0 0	Estimated acreage.
Do further works ...	Nov. 1870	Dec. 1870	—	970 0	967 48	—	For gratings
Do extra works ...	Dec 1872	July, 1873	—	2783 50	2657 40	—	For extra works, consisting of well grating, new angle irons for sluice, and extra earthwork in bund.
			6010 0	3753 50	9403 77		
Anicut across Kurundu-oya ...	Aug. 1877	Dec 1878	—	1900 0	1868 57		
Reservoir, Barrack Plain, Nuwara Eliya	April, 1877	Dec. 1878	—	23870 0	23152 62	—	
Dehihattawela Galova anicut ...	July, 1879	Jan. 1880	—	12888 0	12840 46	—	
Do additional Ela...	Nov. 1879	Dec. 1879	—	1600 0	1597 81	—	
Teldena anicut ...	Feb. 1880	Dec 1880	—	8613 0	6935 61	—	
Sudupanawela anicut ..	Dec. 1880	—	—	14100 0	—	—	Not completed
Kendala-ela anicut ...	July, 1880	—	—	3240 0	—	—	do. do.
			—	40441 0	21373 88		
NORTH-WESTERN PROVINCE.							
Magalawewa, Nikaweratiya ...	Sep 1877	Dec. 1873	—	55740 0	50095 30½	3000 0 0	Acreage estimated to be benefited out of a larger tract. Not executed under Ordinance.
Do construction of irrigation channel ...	Nov 1877	July. 1878	—	9365 0	9365 0	1200 0 0	Necessary for completing the scheme to take water to lands not now cultivated.
Carried forward...			—	65105 0	59460 30½		

Name of Tank, Ameut or Channel	Date of commencement	Date of completion	Amount of original estimate to be repaid by people	Amount of estimate to be defraved by Government.	Actual Expenditure	Estimated Acreage capable of Irrigation	Remarks.
			Rs. cts.	Rs. cts	Rs. cts	A. R. P.	
North-Western Province—*contd*							
Brought forward ..	—	--		65105 0	59460 30½		
Restoring the channel behind the dam, Magalawewa ..	April, 1876	Dec 1877	—	517 0	450 28		
Magalawewa, improvement of spill	April 1878	June, 1878	—	858 0	857 61	—	Water from one spill damaged the back of the bund.
Magalawewa, Nikaweratiya, extending a channel .	July, 1880	Dec 1880	—	700 0	699 92	—	Necessary to irrigate lands sold by Government.
			—	67180 0	61468 11½		
Wenoruwewa, Kurunégala .	July, 1871	Sep 1872	9459 50	—	9418 56	400 0 0	
Do completion .	Aug 1872	Mar 1873	—	12003 0	1,062 7½	—	Includes works not considered necessary in original plan.
Do. do .	June, 1873	Aug 1873	—	2405 0	2389 59	—	Includes extra spill, planks for sluice, extra earthwork, and over-expenditure on masonry of sluice
Do repairing damage done to main spill.	Aug. 1875	Dec. 1875	—	2229 0	2092 11		
Do. Bu-ela sluice	Mar 1874	Sep 1874	—	979 0	977 97	—	To insert a sluice in the Bu-ela.
			9459 50	17616 0	26880 30½		
Galkulam sluice	June, 1869	Dec 1869	429 92	—	429 92	—	Acreage from Government Agent's returns
Do repairs	Sep 1873	—	—	353 0	310 88	--	First work defective: sluice placed by mistake two feet too high
			429 92	353 0	740 80		
Kospotu-oya ameut	Dec 1870	June, 1872	14001 50	--	10783 34	300 0 0	Acreage estimated.
Timpitiyawewa .	Nov 1870	do	30000 0	—	30000 0	1100 0 0	Acreage estimated to be benefited out of a larger tract.
Do. additions	May, 1876	Dec 1876	—	2424 0	2424 0		
Do repairing outlet sluice	June, 1877	--	—	2420 0	338 6	—	Expenditure up to 31st July, 1878
Do extra inlet sluice	Feb 1874	Dec 1874	5000 0	-	4783 83	--	Asked for by the people
Do tank, repairing .	Feb 1878	Dec 1878	—	426 0	301 99		
			35000 0	5270 0	37817 88		
Deduru-oya head sluice ...	Mar 1870	Dec 1870	4755 0	-	4251 71	1100 0 0	Acreage estimated to be benefited
Munnesseram channel from the Deduru oya ...	do.	Aug 1873	16525 0	--	16067 15	—	This and the last are one scheme
Deduru-oya pile dam across	June, 1878	Dec. 1878	—	3358 0	2896 29	—	Part of Mr Dawson's scheme.
			21280 0	3358 0	23215 15		
Mahauswewa, repairing tank	Jan 1876	July 1877	—	35215 0	35215 0	1200 0 0	A water rate of one rupee an acre to be paid by purchasers of lands
Do supplementary ..	July, 1877	Dec 1877	--	2509 0	2412 96		
Do. puddling bund ..	Feb. 1878	June, 1879	—	9130 0	9125 64	—	Necessary on account of leakage under the old bund
			-	46845 0	46653 60		
Galgamuwa, construction of sluice and spill ...	April, 1876	June, 1877	—	15774 0	15208 34	—	A water-rate of one rupee an acre to be paid by proprietors of lands
Do. pitching part of the bund .	Feb 1879	July, 1879	—	300 0	296 56	—	Rendered necessary by the force of the waves.
			--	16074 0	15504 90		
Kurunegala tank, repair of breach	June, 1878	Sep. 1878	—	4059 0	4059 0		
Ingiriyatiya village tank, construction of a sluice ..	Dec 1876	Nov. 1877	--	1088 0	971 71	90 0 0	
Karambewa do .	do	April 1877	--	1088 0	1082 65	40 0 0	
Gallewa do. .	do	Sep 1877	—	1088 0	1087 5	50 0 0	
Tammanawa do	do.	Aug 1877	—	1088 0	1085 16	50 0 0	Repaired on the Village Tank system
Periyakulam do.	do.	Sep 1877	--	1088 0	1084 67	60 0 0	
Kotukachchiya do .	July 1877	Dec 1878	—	1088 0	1077 51	160 0 0	
Bandarakoswatta do. ..	Sep 1877	May 1878	—	1088 0	1079 0	110 0 0	
Pennitawewa do. .	Nov 1877	Mar. 1878	—	1088 0	1076 34	137 0 0	
Konkadawala do	Dec. 1877	Sep 1878	—	1118 0	1118 0	60 0 0	
Wewagedara do. ..	Sep. 1877	Mar 1878	600 0	-	695 27	120 0 0	Cost to be paid by villagers on completion of work.
Pambawatawana construction of a sluice	Mar 1878	May, 1878	—	1088 0	1044 0	82 0 0	Repaired on the Village Tank system.
Mahagalkadawala do	May, 1878	Dec. 1878	—	1088 0	1088 0	90 0 0	do do.

Name of Tank, Anicut or Channel.	Date of commencement.	Date of completion	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	REMARKS.
			Rs. cts.	Rs. cts.	Rs. cts.	A. R. P.	
NORTH-WESTERN PROVINCE.—*contd.*							
Mediyawe tank, construction of sluice and spills ..	May, 1878	May, 1879	—	10383 0	10380 26	600 0 0	A water rate of one rupee an acre to be paid for ten years by owners of lands. Earthwork to be done by the villagers.
Do repairing the bund ..	April, 1879	Aug. 1879	4928 0	—	4926 77	—	Cost to be repaid by villagers in ten annual instalments.
Do puddling part of the bund ...	April, 1880	June, 1880	990 0	—	987 87	—	The cost to be repaid by people, water-rate being recovered annually at the rate of Rs. 2·72 per acre
Mottapettewa village tank, construction of sluice .	June, 1878	Dec. 1878	—	1318 0	1315 45	70 0 0	Repaired on the Village Tank system.
Palukadawela do.	Aug. 1878	May, 1879	—	2238 0	2235 69	400 0 0	
Olupitiyawe do. ...	Aug 1878	June, 1879	—	1088 0	1087 7[illegible]	100 0 0	
Pahala Giribawe do. ...	Aug. 1878	May, 1879	—	1088 0	1088 0	130 0 0	
Mitto do . .	Nov 1878	June, 1879	—	1088 0	1086 51	150 0 0	
Ambanpola do. ...	do	—	—	1118 0	147 85	70 0 0	Work stopped on account of disagreement among the shareholders
Maha Dewulwewa do. ..	do	—	—	1088 0	519 86	74 0 0	do. do.
Madadumbe do. ...	Oct 1878	June, 1879	—	1118 0	1118 0	70 0 0	Repaired on the Village Tank system.
Tattawe do ...	Nov 1878	April, 1879	—	1088 0	1087 88	70 0 0	
Perumakuttuwa do.	do.	do	—	1088 0	1087 95	54 0 0	
Uppalawatte do ..	do.	do	—	1088 0	1087 24	100 0 0	
Medawachchiya do ...	Jan. 1879	Dec. 1879	—	1088 0	1088 0	100 0 0	
Tambatta do. . .	do	May 1879	—	1088 0	1052 15	70 0 0	
Girulla do. ..	do.	Dec. 1879	—	1088 0	1088 0	50 0 0	
Pahala Nuhatekulam do ..	Mar 1879	June, 1879	—	1088 0	1088 0	100 0 0	
Mahakarinde do ...	do	do	—	1088 0	1086 35	40 0 0	
Uduweriya do.	do.	Dec. 1879	—	567 90	567 87	62 0 0	Materials purchased for Maha Dewulwewa were used for this tank
Pahala Mawategame do. .	April, 1879	June, 1879	—	1088 0	1088 0	61 0 0	Repaired on the Village Tank system.
Lukoleptiya do .	Mar 1879	Dec 1879	—	1088 0	1087 7	-	
Malpowewa do ...	May, 1879	Aug. 1879	—	1088 0	1087 64	100 0 0	
Maha Naneriya do. ...	Aug 1879	Mar 1880	—	2453 0	2452 91	115 0 0	
Molewa do ..	do.	do.	—	1088 0	1087 64	95 0 0	
Mahadewulwewa do	do	do	—	1088 0	1087 76	74 0 0	
Unala do	do	Dec. 1879	—	1088 0	1088 6	140 0 0	
Pilla do. .	do	Mar 1880	—	1088 0	1087 93	60 0 0	
Kettapahuwe do. . .	do	Feb 1880	—	1088 0	1088 0	160 0 0	
Kokichankulam do. ...	Aug 1880	Mar. 1881	—	1088 0	1087 89	--	
Udauna do. .	do	Dec. 1880	—	1088 0	1083 54	—	
Ma Eliya sluice and spill	do	Mar. 1881	—	2610 0	2609 67	—	
Kirimitiya sluice .	do.	do.	—	1088 0	1075 82	-	
Sulugalla sluice and spill	do	Dec 1880	—	2414 0	2414 3	470 0 0	
Dehenegama sluice . ..	do	do	—	1088 0	1085 57	54 0 0	Repaired under the Village Tank system—expenditure up to 30th June, 1881
Motchiya do. ..	May, 1881	—	—	1088 0	837 12	61 0 0	
Ambanpola do. .	do	—	—	1118 0	300 1	—	
Balalla village tank do. ..	do	—	--	1118 0	790 96	80 0 0	
Detowa do . .	do	—	—	1118 0	565 38	32 2 0	
SOUTHERN PROVINCE.							
Denagama-áru, Weyanwewa tank .	Oct 1868	Dec. 1870	18255 0	—	18254 83	2000 0 0	Provides the masonry only. People are to execute the earthwork
Denagama tank, formation of bund .	June, 1869	May, 1870	3500 0	—	3499 98	—	Partial estimate for earthwork.
Denagama and Weyanwewa, completion of earthwork bund	Oct 1869	Dec 1870	20722 0	—	20722 0	—	Remainder of estimate of earthwork.
Do. completion of works ..	Feb 1871	June, 1872	—	3825 25	3825 16		
Do repairing breach ...	May, 1871	Oct 1872	—	17790 0	17789 88	—	Bund breached by seven floods.
Do. closing breach ...	July, 1872	do.	—	2750 0	2749 81	—	Estimate for repair insufficient.
Do. construction of a bund	Nov 1874	Oct 1876	—	40715 0	40714 82		
Do. bund, repairing slip ..	Jan. 1880	April 1880	—	495 0	494 92		
Do. completing ..	Nov. 1876	Dec. 1876	—	4045 45	4045 45		
Denagama tank, wing walls to Wepitierre sluice ...	April, 1879	Dec. 1879	—	3000 0	2838 94		
Do. puddle trench .	May, 1880	June, 1880	—	289 0	286 74		
Do. supplementary ...	April, 1877	April, 1877	—	191 91	191 91		
Carried forward ..	—	—	42477 0	73101 61	115414 44		

Name of Tank, Anicut, or Channel.	Date of commencement.	Date of completion	Amount of original estimate to be repaid by people	Amount of estimate to be defrayed by Government	Actual Expenditure	Estimated Acreage capable of Irrigation.	Remarks.
Southern Province—*contd.*			Rs cts	Rs cts	Rs cts	A R P	
Brought forward .	—	—	42477 0	73101 61	115414 44		
Denegama tank, compensation	—	—	—	400 0	4 0 0	—	For lands destroyed through the bursting of the bund
Hakmana channel from Denagama	Sep. 1872	Dec 1872	—	1034 0	1033 91	—	Extra work asked for by Assistant Government Agent, Mátara.
Completing the masonry protecting walling in the flood channel feeding the Weangwewa tank ...	Nov 1877	Nov 1877	—	721 28	721 28		
Widening and strengthening the channel which feeds the Weangwewa tank ..	Aug. 1876	June, 1877	—	4130 0	4129 99		
			42477 0	79386 89	121699 62		
Wankadawewa Borala ..	Oct 1868	May, 1869	1350 0	—	1349 50	421 0 0	Acreage from Government Agent's return Estimate is only for sluices
Do. repairing masonry works	May, 1870	Aug. 1870	—	120 0	120 0	—	Repairs to one of the sluices.
			1350 0	120 0	1469 50		
Kekanadura tank and channel	Aug 1869	Feb 1871	55000 0	—	54950 29	2000 0 0	Acreage surveyed; originally 2,800 acres were contemplated, but this has been found to be impracticable, and now only 915 acres are to be assessed.
Do. repairing damage	May, 1880	Dec 1880	—	2788 34	2787 98		
Do extra works ..	Nov. 1870	Nov 1870	—	1215 0	1215 0	—	Extra works claimed by the contractor
Do channel completion	Aug 1871	Oct. 1871	—	4500 0	4498 48	—	To cover extra cost of blasting much heavier rock-cutting than had been anticipated
Do. repairs to embankment and deepening channels	Oct. 1874	Feb. 1875	—	4486 0	4485 49	-	Repairs of embankment breach, and cutting out channels to full width
Do compensation for lands submerged by tank .	Nov. 1875	Dec 1875	—	144 0	141 0		
Compensation, Badakaluwadeniya dam at Kekanadura .	-	Nov 1875	-	71 50	71 50		
			55000 0	13204 84	68152 74		
Digoda tank	Dec 1872	June, 1873	2966 15		2951 10	124 0 0	Acreage from Government Agent's returns
Do. compensation	—	—	1183 25	-	1183 25	-	For the land submerged by the tank, not included in original estimate.
Do. repairing ..	April, 1875	Dec 1875	—	200 0	199 18		
Do. do.	Sep 1875	do.		656 0	650 51		
Do. retaining-wall for the channel ...	Oct. 1878	Dec 1878	-	120 0	119 73		
Do. bridle-path to .	Sep 1879	Dec 1879	--	344 0	322 0		
			4149 40	1320 0	5425 77		
Hali-ela tank	Mar 1871	Dec. 1872	40370 0	—	40370 0	7000 0 0	This and the following eight works are for the irrigation of the Gangaboda pattu, Matara
Do. repairs to joints in the masonry in sluice tower and channel ...	July, 1876	Nov 1876	—	250 0	174 76		
Do. completion	Oct. 1872	Nov. 1872	5932 0	—	3675 23		
Do. channel to Urapola and Padagala	Aug 1873	Dec 1874	19873 0	—	19777 80		
Do extension ..	April, 1875	May, 1875	380 0	-	213 0		
Do. repairing damage ...	May, 1880	Mar. 1881	—	823 0	642 24		
Ellawella tank (2) ...	Dec 1872	Nov 1874	80131 0	—	80130 91		
Do. channel cutting and sloping banks ..	Mar. 1875	Dec. 1875	-	900 0	899 1		
Do. repairing damage ..	May, 1880	Sep. 1880	—	2441 66	2441 62		
For completing all extra work necessary for the safety of the Ellawella channel ..	Oct 1876	Aug 1877	—	6800 0	6698 17		
Ellawella, construction of extra works ..	Sep. 1875	July, 1876	1045 0	--	1042 31		
Do. completing ...	Mar. 1876	June, 1876	—	528 0	527 83		
Do. construction of branch to Tombe fields	May, 1875	Dec. 1875	710 0	—	623 54		
Do. compensation ..	July, 1876	July, 1876	644 74	—	616 12		
Carried foward .	—	—	149095 74	11742 66	157842 54		

Name of Tank, Anicut, or Channel	Date of commencement	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	REMARKS.
			Rs. cts.	Rs cts	Rs. cts.	A. R. P.	
SOUTHERN PROVINCE—*contd.*							
[Brought forward ...	—	—	149085 74	11742 66	157832 54		
Sapugoda (3) Urapola anicut (4)	April, 1871	Dec 1871	4050 0	—	4015 46		
Wooden bridge over the anicut at Sapugoda ...	Sep 1876	Sep 1876	—	184 0	168 76		
Urapola anicut, completion ...	Dec. 1872	Dec. 1873	—	2760 0	2709 18		
Sapugoda channel head sluice (5)	Dec 1873	do	734 0	—	668 15		
Pettre anicut (6) ...	Oct. 1873	Oct. 1875	18729 0	—	18487 94		
Do. ...	Mar. 1875	Aug. 1875	—	1200 0	1161 85		
Proposed channels of Pettre anicut ...	—	—	—	5451 53	5422 46		
Alawattegoda anicut (7) ...	Feb. 1874	—	16204 0	—	16202 19		
Do. completion ..	Mar. 1876	Feb. 1878	—	3135 0	3127 48		
Batuwita channel (8) ..	May, 1871	Dec 1872	16120 0	—	16111 97		
Do. regulating weir, &c., to stream above ...	April, 1879	Nov 1879	—	870 0	869 86		
Uduwa channel (9) ..	Feb. 1872	Dec. 1872	10200 0	—	10199 40		
Batuwita and Uduwa channel completion ...	Oct 1872	Dec 1874	—	11696 0	11695 36	—	Completed.
Gangaboda-pattu irrigation works ...	Dec. 1875	Mar. 1878	—	40733 0	37309 57		
Completing of do .	Sep. 1876	Dec 1877	—	10143 11	10137 96		
Do ..	—	—	—	4473 69	4241 87		
Rebuilding an accommodation bridge over the canal at Urubokka .	Oct 1876	Nov 1877	—	477 0	477 0		
Dandeniya tank . ..	Dec 1877	Dec. 1879	—	45279 0	45278 99		
Do. lining tunnel .	July, 1880	Dec 1880	—	3850 0	3600 93		
Do channel, repairing damage . ..	Aug 1880	Dec 1880	—	13 0 0	1223 97		
Batuwita, construction of extra works ..	Jan 1875	Sep 1877	—	2480 0	2175 19		
Do compensation for damage to lands by alteration	—	—	—	109 0	—		
Anicut and flood channel, Ellawella ..	Mar 1877	Jan 1878	—	9297 50	8863 6		
Kirama river, Matara, construction of two irrigation sluices .	April, 1875	Oct 1875	330 0	—	308 8		
			215452 74	155181 49	362289 22		
Wehella or Hendetiya tank	July, 1873	Nov 1873	789 0	—	644 96	75 0 0	Acreage from Government Agent's returns.
Do repairing	April, 1878	Nov 1878	—	500 0	374 42		
Do repairing damage	Aug. 1880	Oct 1880	—	426 0	404 79		
			789 0	926 0	1423 17		
Tissamaharama tank ..	April, 1871	Nov 1873	—	35930 0	35921 73	1400 0 0	Partial estimate for bund only. Work not executed under Ordinance. Water-rate to be levied on lands irrigated.
Do. spill at .	July, 1880	Nov. 1880	—	801 0	800 65		
Do deepening and extending east high level channel	Mar 1881	July, 1881	—	863 0	863 0		
Tissamaharama to Suttrawelle, channel from .	Oct. 1880	July, 1881	—	8835 0	8835 0		
Bridge over irrigation channel at Mailagastota	April, 1876	Sep. 1876	—	810 0	810 0		
Tissamaharama, for raising the external walls of the outlet sluice and for the excavation of two high-level channels .	do.	Dec 1877	—	3569 0	3569 0		
Do completion	Dec 1872	May, 1874	—	9740 0	9610 75		
Do anicut and channel	June, 1874	Dec 1876	—	79754 0	79342 7		
			—	140302 0	139752 20		
Udukiriwila tank ..	Mar. 1871	Dec 1873	65960 0	—	64424 22	5000 0 0	Estimated acreage; but actual amount said to be 2,500.
Do. completion .	Mar 1873	Sep. 1873	—	7754 0	7751 90	—	Estimate necessary, owing to design of tank having been altered.
Pitching toe of bund, Udukiriwila ...	July, 1876	Dec 1878	—	1091 0	1090 27		
Udukiriwila anicut, raising wing walls and filling in earth .	April, 1878	do.	—	1260 0	962 52		
Carried forward ...	—	—	65960 0	10105 0	74228 91		

Name of Tank, Anicut, or Channel.	Date of commencement.	Date of completion.	Amount of original estimate to be repaid by people.	Amount of estimate to be defrayed by Government.	Actual Expenditure.	Estimated Acreage capable of Irrigation.	Remarks.
			Rs. cts.	Rs. cts.	Rs. cts.	A. R. P	
Southern Province.—*contd.*							
[Brought forward ...	—	—	65960 0	10105 0	74228 91		
Fixing sluice at Kambrogamuwa tank	May, 1878	Sep. 1878	—	840 0	756 9		
Fixing sluice at Kumbalgama tank	June, 1878	Dec. 1878	—	840 0	796 56		
Fixing sluice at Mahawewa tank, Naorane	May, 1878	Sep. 1878	—	840 0	797 4		
Fixing sluice at Makewita tank.	do.	do.	—	840 0	763 37		
Ellagala and Tissamaharama, repairing damages ...	April, 1878	Aug. 1878	—	1284 0	1280 74		
Ellagala and Tissamaharama certain works at ...	Feb. 1879	Oct. 1879	—	3325 0	3323 21		
Weangwewa tank, repairs ...	Jan. 1880	April, 1880	—	379 0	379 0		
Marambe tank, masonry wall across the spill ...	June, 1880	Sep. 1880	—	132 0	130 75		
Urubokke, bridge at ...	July, 1880	Nov. 1880	—	495 0	380 85		
Willa-ela channel, Udukiriwila tank, repairing damage ...	Mar., 1880	May, 1880	—	700 0	569 79		
Dewiture irrigation works, repairs ...	Oct. 1880	Dec. 1880	—	100 0	99 24		
Northern Province.			65960 0	19880 0	83505 55		
Vavuniya-Vilankulam tank, restoring .	April, 1880	Dec. 1880	—	11000 0	10807 97	200 0 0	114 acres cultivated—100 acres Crown land.
Chinnar dam at Mullaittivu, repairing ...	Mar. 1880	July, 1880	—	300 0	296 11		
Vellykulam, fixing sluice ...	Nov. 1880	Dec. 1880	—	1000 0	981 36	18 0 0	16 acres cultivated.
Manducotta tank, fixing sluice .	do.	do.	—	850 0	345 38	81 0 0	79 acres cultivated—13 acres Crown land.
Do. do. ...	Feb. 1881	June, 1881	—	504 0	504 0		
Irampaikulam, fixing sluice ...	Nov. 1880	Dec. 1880	—	850 0	486 0	22 0 0	20 acres cultivated—2 Crown land.
Do. do. ..	Feb. 1881	June, 1881	—	364 0	364 0		
Peramanana tank, do. ..	Nov. 1880	Dec. 1880	—	900 0	363 55	5 0 0	4 acres cultivated.
Do. do ..	Feb 1881	June, 1881	—	473 0	473 0		
Iraperiyakulam tank, do ...	April, 1881	July, 1881	—	1400 0	1400 0	80 0 0	71 acres cultivated—20 acres Crown land.
Vymankallu tank, do. ...	do.	June, 1881	—	1000 0	1000 0	40 0 0	32 acres cultivated—10 acres Crown land.
Mamadu tank, do. ...	do.	July, 1881	—	1400 0	1400 0	60 0 0	40 acres cultivated, all Crown land.
			—	20041 0	18421 37		

Public Works Department,
Colombo, January, 1882.

J. F. CHURCHILL,
Acting Director of Public Works.